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DAILY EDITION

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WE GUARANTEE that of this issue more than 9,200 copies were printed; that of those more than 9,200 copies, 7,048 were mailed to regular paid subscribers, 200 were provided for counter and news companies' sales; and 1,700 were printed for distribution at Atlantic City and for use as sample copies.

AT the recent convention of the Air Brake Association the operation of triple valves was thoroughly discussed. The undesired quick action of the brakes has been carefully investigated by the Duluth, Missabe & Northern and it was found that the triple valve was the chief cause of this difficulty. That road is now using a high grade of fine dry graphite for the triple valve slide valve, which has practically done away with the trouble. It was also found necessary to use a brake cylinder lubricant that would remain at the same consistency in hot and cold weather; some lubricants become lighter and more penetrating in warm weather, working back on the slide valve feed valve and destroying the beneficial effects of the dry graphite. That road now finds its greatest trouble with foreign cars whose triple valves are not so carefully maintained. If some standard practice was adopted in this matter and strictly adhered to, a very material reduction could be made in the number of break-in-twos, thus reducing the maintenance cost of cars.

IN looking over the machine tool exhibit in Machinery Hall, which is larger this year than most of the railway machine shops of this country, with its whirring wheels and big cuts with high speed tools, one's mind instinctively wanders back a few years to the time when machine tools were few and far between. When the conventions were held at Saratoga power was not available for operating machine tools, and it was only occasionally that such a tool was shown, and then not in operation. The first time that the machine tools were a feature of any convention of railway officers was at the International Railway Congress meeting at Washington in 1905. At that ime, owing to the efforts of J. Alexander Brown, the secretary and director of the exhibit, a considerable number of tools was shown in operation. The machine tool builders were so pleased with the result that a number of tools were shown at the next meeting of the M. M. and M. C. B. conventions which was held on the steel pier. Because of the weight carrying limitations of the steel pier the larger machine tools could not be accommodated, but in spite of this a considerable number of such tools was shown during the two years the conventions were held there. The Million Dollar Pier afforded such good facilities for this purpose that the exhibit has grown steadily ever since. This year practically all the space in Machinery Hall, 360 ft. long by 45 ft. wide, is given over to machine tools and one need only to stroll through it at any time during the day to be convinced of its popularity with the convention attendants.

THE young railway men and supply men attending these conventions can do themselves great and permanent good by looking about them, and taking careful note of certain very important developments that are occurring in the railway and supply business. The developments in question are all closely asociated with a very marked moral awakening that is taking place throughout the entire business world. It has not been many years since personal conduct and business methods prevailed generally, and were generally tolerated, which to-day are avoided, repudiated and condemned by every man who has any real self-respect or desire for the respect of others. There are a few here and there, some of them in very high places in the railway and supply business, who are so lacking in moral sense, or so incapable of observing the trend of the times, or have so much contempt for public opinion, that they do not, and perhaps cannot, come up to modern standards in their manners and conduct. Some of them have been able up to the present time, in spite of this, to maintain their positions in the railway and supply business. But hardly a day passes without some event ocurring which shows there is no man in the railway or supply business who is too big to be reached and disgraced, if not actually ruined, if he persists in the use of methods that defy public opinion and fall below a high standard of decency and honor. The railway and supply history of this country in recent years is strewn with the wreckage of little men and big men who have had the notion, equally reprehensible and stupid, that they could persistently over-ride and defeat the opinions of their fellows, and the dictates of law and of morals. The young men attending these conventions will profit greatly if they will learn *now* that they are living in a new era; that the old ways are not the new ways; that certain methods that formerly were condoned and sometimes spelled success are now condemned and denounced and spell certain failure; and that not only the future, but the immediate present, belongs to the decent man, to the square man, to the man who helps to make the right kind of public opinion and who then respects and heeds the kind of public opinion that he knows to be right.

THE problem of increasing the efficiency of common labor in railroad shops and repair yards is a most difficult one and must be given more attention, as suggested by President Crawford in his address on Wednesday morning. The need of employing interpreters, or of having foremen who can understand foreign languages and thus direct the men to the best advantage, has not been as apparent in the motive power and car department as in maintenance of way work. Mr. Crawford's idea, however, is that as the demand for common labor increases, more and more of the foreign element will find employment in the mechanical department and that conditions will be much improved if the foremen, and particularly those in charge of unskilled and semi-skilled labor, become proficient in a foreign language, thus avoiding the necessity of using interpreters, which is usually a more or less unsatisfactory arrangement. Mr. Crawford's suggestion that more attention be given this phase of the problem is, therefore, an excellent one. There is another problem which involves the skilled, as well as the unskilled employes, and should be given immediate atten-

tion. It is the more careful selection and assignment of workmen for the different classes of work. The necessity of this has been realized in the railway shops of several of the European countries, and more particularly in the Hungarian State Railways. The practice of that railway system in the shops at Buda Pesth was described in a series of articles on Impressions of Foreign Railway Practice by H. W. Jacobs, which appeared in the *Railway Age Gazette* during the past few months. The personality and characteristics of each man are carefully studied during his apprenticeship, and he is later assigned to the particular kind of work for which he is best fitted. In this country comparatively little attention has been given to this matter, except in a few isolated cases, none of which, as far as we can find, are on railroads. Of course, a good executive intuitively selects the men who are best qualified for work in his department, but in these days of large organizations, more scientific methods must be used in order that the efficiency of the organization as a whole shall not unnecessarily suffer. Possibly the most advanced exponent of this theory is Dr. Katherine Blackford. She has had unusual success and has discovered and outlined certain principles which should govern the selection of employes. These include not only a study of the physical characteristic and character of the workman and the class of work for which it is proposed to use him, but also the personality of the man he is to work for, or the boss, as she calls him. While her methods and views are so advanced as to be beyond the comprehension of many of those in charge of forces of workmen, there can be no question as to the value of a more scientific study of this problem, and the Master Mechanics' Association can well afford to give it more attention.

GEARING IN MACHINE TOOLS.

AMONG the most important features of the extensive improvements in machine tools in recent years is the full appreciation, by some of the builders, of the value of proper material, properly treated, for the gearing. In the earlier stages of machine tool building, cast iron was exclusively used for gears and pinions, and it has a number of advantages for this use. Because of the large percentage of uncombined carbon in it, it is practically self-lubricating and will run without serious wear with the minimum of oil, or even with no oil at all. Furthermore, its cheapness and ease of machining, and the convenience of obtaining the rough stock in case of an emergency, make it attractive. Its structural weakness and inability to withstand shocks, however, make it unsuitable for use on many of the modern, high power, machine tools, except for a few unimportant gears.

With the advent of steel gears came the necessity of more thorough lubrication, as this material is in no degree self-lubricating and wears rapidly when run dry. It has been found, however, that, even with what would ordinarily be considered good lubrication, the quality of material used makes a surprising difference in the wearing qualities and strength of the teeth. One of the large machine tool manufacturers has exhaustively investigated this subject during the past four or five years, and developed some valuable information. The first steel gears were made from ordinary spindle steel having a carbon content of about 40 points. A gear was made from this material without further treatment and was run under working conditions with a pinion of similar material case-hardened. Grease was used for lubrication. The gear wore rapidly, and it was clearly shown that this material was not suitable in that form. Trials with the same combination running in oil gave better results, but by no means satisfactory service. A pair of gears of the same steel, both case-hardened, was then tried running in oil. The wearing qualities were practically perfect, but it was found that the process of case-hardening had apparently affected seriously the interior structure of the teeth and they were not able to properly withstand a shock or even a heavy strain.

Trials were next made with two gears of a high carbon alloy steel, case-hardened. These showed practically the same structural weakness and were discarded. The experience thus far indicatd that case-hardening, while excellent to produce the desired wearing qualities, apparently weakened the best material to a serious extent. Oil tempered manganese steel with a low carbon content was then tried. This gave much better results, but still the wear was more than it was believed should take place. The strength was found to be satisfactory. An investigation of the practice of some of the leading automobile manufacturers was then made, and the next tests were with a material that had been found suitable for that purpose. This is a heat treated, oil hardened, nickel-chromium steel. These gears fulfilled all requirements both as to wear and strength when the treatment and composition were exactly right. A great variation was found in the result by an error even as low as 25 deg. in the temperature at which it is hardened. Furthermore, the exact proportions of the alloys are found to be of equal importance. Experiments with steel of this kind made from ores having the desired elements in natural combination were not successful, and all the later experiments point to the vital importance of exactness in the composition and treatment. In the case of this manufacturer, this feature is believed to be of so great importance that a complete chemical and physical laboratory for testing steels is being installed.

This is but one example of the way in which the problems of producing a high grade, modern machine tool are being solved. It is becoming better understood that the present demands for output from machine tools of all kinds require the employment of the highest grade of engineering skill and the use of materials which were practically unknown a few years ago. It is comparatively easy to build a lathe, shaper or drill press which will take a very heavy cut, but to produce such a machine which will continue to do it accurately and without failure of parts is a problem of considerable magnitude. That many are doing it speaks well for the continued progress of the industry.

A CRITICISM, AND AN ANSWER.

Atlantic City, June 13, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

These conventions are really a post graduate course for railroad men, who come here to exchange ideas and match experience with the keenest intellects in their line of endeavor. Here they discuss problems, adjust differences, acquire knowledge and deal in facts, born of actual experience, all with a view to formulating rules for the safety, advancement and betterment of railroad operations.

Most professions offering a post graduate course to their members supplement the work of the lecture room and the convention hall with a *practical clinic*, and this world-wide, every-day working university of railroad mechanical construction and operation has a valuable clinic, supplied by men whose interests dove-tail very closely with that of their railroad customers.

This clinic each year increases its scope and aims to extend its usefulness, but each year there is a growing feeling on the part of those who provide this feature of the convention that the exhibits are not receiving their share of attention.

Is the clinical feature of this convention being neglected and are its possibilities as factors in the progress and development, so earnestly desired by all, being underestimated to an extent that will lead the manufacturers to conclude that their efforts to contribute their mite in the form of this educational work are not appreciated?

There is a serious thought back of this question, involving as it does the consideration of the futility of coöperation that is apparently one-sided. In the joy of fellowship the serious business feature of these occasions should not be neglected, and the fact that the exhibits offer educational advantages, second only to the benefits of the meetings themselves, cannot be overlooked without serious injustice to both interests involved.

TOM LEHON.

The *Railway Age Gazette* gladly publishes Mr. Lehon's letter. But, while it agrees fully with what he says as to the merits of the exhibitions, it does not believe that the railway men attending the conventions fail, as he seems to imply, to take full advantage of it. Doubtless many of them might give more attention to it; but most of them do give a great deal of attention to it. Furthermore, the amount of time railway men give to the exhibits has been increasing year by year. They are of great mutual benefit to the supply men and the railway men, and never in our opinion, has this been more true than it is this year.

PROGRAM OF THE WEEK.

MASTER CAR BUILDERS' CONVENTION.

MONDAY, JUNE 16.

9.30 A. M. to 1.30 P. M.

Address by the president	9.30 A. M. to 10.30 A. M.
Reading of the minutes of the last meeting	10.30 A. M. to 10.35 A. M.
Report of secretary and treasurer	10.35 A. M. to 10.50 A. M.
Assessment and announcement of annual dues; appointment of committees on correspondence, resolutions, obituaries, etc	10.50 A. M. to 11.00 A. M.
Election of auditing committee	11.00 A. M. to 11.05 A. M.
Unfinished business	11.05 A. M. to 11.10 A. M.
New business	11.10 A. M. to 11.20 A. M.
Discussion of reports on:	
Nominations	11.20 A. M. to 11.30 A. M.
Revision of standards and recommended practice	11.30 A. M. to 11.45 A. M.
Train brake and signal equipment	11.45 A. M. to 12.00 M.
Brake shoe and brake beam equipment	12.00 M. to 12.30 P. M.
Coupler and draft equipment	12.30 P. M. to 1.00 P. M.
Car wheels	1.00 P. M. to 1.30 P. M.

3.00 O'CLOCK P. M.

The executive committee decided that it would be best to have a session devoted exclusively to a discussion of the revision of the rules of interchange. Heretofore it has been the custom to hold an informal discussion on the report of the arbitration committee on the revision of these rules, and no record made of the meeting except that possibly the arbitration committte might make some changes in its recommendations. The record of this meeting will now be a part of the proceedings.

At this session the following reports of committees will be considered:

1. Arbitration committee.
2. Conference with Association of American Railway Accounting Officers.
3. Revision of Prices for Labor and Material.

TUESDAY, JUNE 17.

9.30 TO 1.30 P. M.

Discussion of Reports on:	
Safety Appliances	9.30 A. M. to 9.45 A. M.
Rules for Loading Materials	9.45 A. M. to 10.00 A. M.
Overhead Inspection	10.00 A. M. to 10.15 A. M.
Car Trucks	10.15 A. M. to 10.45 A. M.
Train Lighting and Equipment	10.45 A. M. to 11.30 A. M.
Train Pipe and Connection for Steam Heat	11.00 A. M. to 11.15 A. M.
Tank Cars	11.15 A. M to 11.45 A. M.
Specifications for Tests of Steel Truck Sides and Bolsters for Cars of 80,000, 100,000 and 150,000 Pounds Capacity	11.45 A. M. to 12.00 M.
Topical Discussion:	
Retirement from Interchange Service of Cars of 40,000 and 50,000 Pounds Capacity	12.00 M. to 12.30 P. M.
Discussion of Reports on:	
Capacity Marking of Cars	12.30 P. M. to 1.00 P. M.
Lettering Cars	1.00 P. M. to 1.30 P. M.

WEDNESDAY, JUNE 18.

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Damage to Freight by Unloading Machines	9.30 A. M. to 10.00 A. M.
Air-brake Hose Specifications	10.00 A. M. to 10.30 A. M.
Revision of Present Specifications	10.30 A. M. to 11.30 A. M.
Car Construction	11.00 A. M. to 11.30 A. M.
Unfinished business; Reports of Committees on Correspondence, Resolutions, and such other committees as may be named during the convention	11.30 A. M. to 11.45 A. M.
Election of Officers	11.45 A. M. to 1.30 P. M.

Adjournment.

ENTERTAINMENTS.

MONDAY, JUNE 16.

Orchestra Concert, 10.30 A. M.—Entrance Hall, Million Dollar Pier.

Orchestra Concert, 3.30 P. M.—Entrance Hall, Million Dollar Pier.

Social Gathering and Informal Dance, 9.00 P. M.—Blenheim Exchange, Marlborough-Blenheim Hotel.

TUESDAY, JUNE 17.

Orchestra Concert, 10.30 A. M.—Entrance Hall, Million Dollar Pier.

Orchestra Concert, 3.30 P. M.—Entrance Hall, Million Dollar Pier.

Informal Dance, 9.30 P. M.—Entrance Hall, Million Dollar Pier.

B. & O. CLUB.

The annual meeting of the B. & O. Club will be held in the Park Place Hall of the Marlborough-Blenheim hotel at 3.30 this afternoon.

LOST.

Supply men's badge No. 2563. Please return to the enrollment booth.

Badge No. 3448 was lost Friday evening, probably on the pier. Finder please return to Secretary Conway's office.

A card case containing personal cards and a railroad ticket to Washington, D. C. Finder please return to T. G. Smallwood, Room 555, Dennis Hotel.

SUPPLY MANUFACTURERS' ANNUAL MEETING.

The annual meeting of the Railway Supply Manufacturers' Association was held in Convention Hall Saturday morning. The attendance was large. President Allen's annual report consisted simply of brief remarks to the effect that the affairs of the association were in excellent shape.

Officers for the ensuing year were chosen as follows:

President, Benjamin A. Hegeman, Jr.

Vice-president, J. Will Johnson.

Members of the executive committee, C. B. Yardley, Jr., J. C. Currie, C. F. Elliott and Joseph H. Kuhns.

In retiring from the chair in favor of the new president Mr. Allen received a rousing vote of thanks.

VISIT THE COUPLER EXHIBIT.

The coupler committee's report will be received and discussed at about noon to-day and if possible every member should visit the committee's exhibit, if only for a few minutes, before the report is presented. The exhibit is just beyond the Convention Hall and consists of nine special designs which have been submitted by different manufacturers, from which it is expected that it will be possible to select one standard design.

In 1911 the coupler committee was authorized to prepare a standard design. Since that time it has given considerable attention to studying the weak points of couplers on roads

where the service is exceptionally severe, and has worked jointly with the coupler manufacturers in outlining the requirements and specifications for a standard design.

Six companies have designed couplers, which according to their experience will best fill these requirements, and they are on exhibition so that the members may examine them carefully and come to some conclusion as to the most satisfactory design. The companies are the Buckeye Steel Castings Company, American Steel Foundries, Gould Coupler Company, The McConway & Torley Company, National Malleable Castings Company and Monarch Steel Castings Company. It is also proposed to change the contour in order to strengthen the coupler, and templates are on exhibition showing the changes which are recommended for consideration.

VALUATION BOARD NEEDS MECHANICAL EXPERTS.

The Interstate Commerce Commission has issued applications for the examinations of men acquainted with railroad operation and construction who desire to enter the government service in connection with the work of appraising the physical property of the railroads. The commission wants a large staff of structural, electrical, mechanical, railway signal, and civil engineers, inspectors of car equipment and motive power, and architects. The salaries will range from $1,080 to $4,800, but as the work mainly takes them away from Washington expenses will be allowed while on duty. July 21 has been fixed as the closing date for the filing of applications.

M. C. B. ASSOCIATION OFFICERS 1911-1912.

President, C. E. Fuller, A. G. M., Union Pacific Ry.

Vice-presidents, M. K. Barnum, G. S. M. P., Illinois Central R. R.; D. F. Crawford, G. S. M. P., Penna. Lines; D. R. MacBain, S. M. P., L. S. & M. S. Ry.

Treasurer, Jno. S. Lentz, M. C. B., Lehigh Valley Ry.

Secretary, Jos. W. Taylor, 390 Old Colony Building.

Executive members, Henry LaRue, M. C. B., C., R. I. & P. Ry.; R. E. Smith, G. S. M. P., Atlantic Coast Line R. R.; C. E. Chambers, S. M. P., Central R. R. of N. J.; F. W. Brazier, S. R. S., N. Y. C. & H. R. R. R.; C. A. Schroyer, S. C. D., C. & N. W. Ry.; Alex. Kearney, A. S. M. P., Norfolk & Western Ry.

M. C. B. ASSOCIATION COMMITTEES.

STANDING COMMITTEES.

Arbitration:—J. J. Hennessey (Chairman), M. C. B., C. M. & St. P. Ry.; T. W. Demarest, S. M. P., Penna. Lines; J. S. Lentz, M. C. B., Lehigh Valley R. R., So. Bethlehem, Pa.; M. K. Barnum, Chicago; F. W. Brazier, S. R. S., N. Y. C. & H. R. R. R.

Revision of Standards and Recommended Practice:—T. H. Goodnow (Chairman), A. S. C. D., C. & N. W. Ry.; W. E. Dunham, Supervisor M. P., C. & N. W. Ry.; W. H. V. Rosing, Asst. to V. P., St. L. & S. F. R. R.; C. E. Fuller, A. G. M., Union Pacific R. R.; T. M. Ramsdell, M. C. B., Ches. & Ohio Ry.; O. C. Cromwell, M. E., Balto. & Ohio R. R.; O. J. Parks, G. C. I, Penna Lines.

Train Brake and Signal Equipment:—R. B. Kendig (Chairman), G. M. E., N. Y. C. Lines; B. P. Flory, S. M. P., N. Y. O. &. W. Ry.; E. W. Pratt, A. S. M. P., C. & N. W. Ry.; R. K. Reading, S. M. P., Penna. R. R.; L. P. Streeter, Air Brake Engr., Ill. Cent. R. R.

Brake Shoe and Brake Beam Equipment:—Chas. H. Benjamin (Chairman), Purdue University; C. D. Young, Eng. Tests., Penna. R. R.; R. B. Kendig, G. M. E., N. Y. C. Lines.

Coupler and Draft Equipment:—R. L. Kleine (Chairman), C. C. I., Penna. R. R.; G. W. Wildin, M. S., N. Y. N. H. & H. R. R.; F. W. Brazier, S. R. S., N. Y. C. & H. R. R. R.; F. H. Stark, Supt. Pittsburgh Coal Co.; J. F. DeVoy, A. S. M. P., C. M. & St. P. Ry.; H. L. Trimyer, M. C. B., S. A. L. R. R.; B. Julien, G. F. C. D., Union Pacific R. R.

Rules for Loading Materials:—A. Kearney (Chairman), A. S. M. P., N. & W. Ry.; R. E. Smith, G. S. M. P., A. C. L. R. R.; L. H. Turner, S. M. P., P. & L. E. R. R.; W. F. Kiesel, Asst. Mech. Engr., Penna. R. R.; J. M. Borrowdale, S. C. D., Ill. Cent. R. R.; C. N. Swanson, S. C. S., A. T. & S. F. Ry.; G. H. Gilman, M. C. B., Northern Pac. Ry.

Car Wheels:—Wm. Garstang (Chairman), S. M. P., C. C. C. & St. L. R. R.; W. C. A. Henry, S. M. P., Penna. Lines; A. E. Manchester, S. M. P., C. M. & St. P. Ry.; R. W. Burnett, G. M. C. B., Can. Pac. Ry.; R. L. Ettenger, C. M. E., Southern Ry.; J. A. Pilcher, M. E., N. & W. Ry.; O. C. Cromwell, M. E., B. & O. R. R.

Safety Appliances:—C. E. Fuller (Chairman), A. G. M., Union Pac. Ry.; A. Stewart, G. S. M. P. & E., Southern Ry.; A. LaMar, M. M., Penna. Lines; C. B. Young, M. E., C. B. & Q. R. R.; H. Bartlett, G. S. M. P., B. & M. R. R.; M. K. Barnum, Chicago; W. O. Thompson, M. C. B., N. Y. C. & H. R. R. R.

SPECIAL COMMITTEES.

1. *Car Trucks.*—J. T. Wallis (Chairman), G. S. M. P., Penna. R. R.; J. R. Gould, G. S. M. P., Ches. & Ohio Ry.; E. W. Pratt, A. S. M. P., C. & N. W. Ry.; R. W. Burnett, G. M. C. B., Can. Pac. Ry.; Jas. Coleman, S. C. D., Grand Trunk Ry.; J. J. Tatum, S. F. C. D., B. & O. R. R.; G. A. Hancock, G. S. M. P., St. L. & S. F. R. R.

2. *Prices for Labor and Material.*—F. H. Clark (Chairman), G. S. M. P., B. & O. R. R.; G. E. Carson, D. M. C. B., N. Y. C. & H. R. R. R.; C. F. Thiele, G. C. I., P. C. C. & St. L. Ry.; Ira Everett, G. F. C. R., Lehigh Valley Ry.; S. T. Park; H. E. Passmore, M. M., T. & O. C. Ry.; J. F. Dunn, A. G. M., Oregon Short Line R. R.

3. *Train Lighting and Equipment.*—T. R. Cook (Chairman), A. E. M. P., Penna. Lines; C. A. Brandt, M. E., C. C. C. & St. L. Ry.; Ward Barnum, Elec. Engr., L. & N. R. R.; J. H. Davis, Elec. Engr., B. & O. R. R.; C. H. Quinn, A. E. M. P., N. & W. Ry.; D. J. Cartwright, Elec. Engr., Lehigh Valley R. R.; E. W. Jansen, Elec. Engr., Illinois Central R. R.

4. *Train Pipe and Connections for Steam Heat.*—I. S. Downing (Chairman), M. C. B., L. S. & M. S. Ry.; C. A. Schroyer, S. C. D., C. & N. W. Ry.; T. H. Russum, S. P. C. D., B. & O. R. R.; J. J. Ewing, M. E., C. & O. Ry.; W. C. Arp, S. M. P., Vandalia R. R.

5. *Nominations*:—F. W. Brazier (Chairman), S. R. S., N.Y. C. & H. R. R. R.; A. W. Gibbs, C. M. E., Penna. Lines; C. A. Seley, Chicago, Ill.; C. A. Schroyer, S. C. D., C. & N. W. Ry.; F. H. Clark, G. S. M. P., B. & O. R. R.

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8. *Specifications for Tests of Steel Truck Sides and Bolsters for Cars of 80,000, 100,000, and 150,000 Pounds Capacity*:—E. C. Schmidt (Chairman), University of Illinois; J. S. Sheafe, Engr. Tests, Illinois Central R. R.; C. D. Young, Engr. Tests, Penna. R. R.

9. *Capacity Marking of Cars*:—C. E. Fuller (Chairman), A. G. M., Union Pacific R. R.; M. K. Barnum, Chicago; A. W. Gibbs, C. M. E., Penna. Lines; F. H. Clark, G. S. M. P., B. & O. R. R.; D. R. MacBain, S. M. P., L. S. & M. S. Ry.

10. *Lettering Cars*:—D. F. Crawford (Chairman), G. S. M. P., Penna. Lines; F. H. Clark, G. S. M. P., B. & O. R. R.; F. A. Torrey, G. S. M. P., C. B. & Q. R. R.; D. R. MacBain, S. M. P., L. S. & M. S. Ry.

11. *Damage to Freight Equipment by Unloading Machines*:—

P. F. Smith, Jr. (Chairman), S. M. P., Penna. Lines; J. J. Tatum, S. C. D., Balto. & Ohio R. R.; E. A. Westcott, S. C. D., Erie R. R.; I. S. Downing, M. C. B., L. S. & M. S. Ry.; J. J. Birch, D. C. I., Norfolk & Western Ry.; C. S. Morse, M. C. B., Wheeling & Lake Erie R. R.

11. *Air-brake Hose Specifications:*—M. K. Barnum (Chairman); J. R. Onderdonk, Engr. Tests, B. & O. R. R.; J. J. Birch, D. C. I., N. & W. Ry.; C. D. Young, Engr. Tests, Penna. R. R.; A. J. Cota, M. M., C. B. & Q. Ry.; I. S. Downing, M. C. B., L. S. & M. S. Ry.; T. H. Goodnow, A. S. C. D., C. & N. W. Ry.

13. *Conference with the Association of American Railway Accounting Officers:*—D. F .Crawford, G. S. M. P., Penna Lines; C. E. Fuller, A. G. M., Union Pacific R. R.; M. K. Barnum.

14. *Revision of Present Specifications:*—C. D. Young (Chairman), Engineer Tests, Penna. R. R.; J. S. Sheafer, Engineer Tests, Ill. Cent. R. R.; J. W. Taylor, Secretary.

15.—*Car Construction:*—W. F. Kiesel, Jr., (Chairman), A. M. E., Penna. R. R.; C. A. Seley, American Flexible Bolt Co.; A. R. Ayres, G. M. E., L. S. & M. S. Ry.; S. G. Thomson, S. M. P. & R. E., Phila. & Reading Ry.; C. E. Fuller, A. G. M., Union Pacific R. R.

THE TRACK EXHIBIT.

A most interesting feature of this year's track exhibit is the inspection locomotive of the Philadelphia & Reading. This locomotive was built at the Reading shops of the company and is of the Atlantic (4-4-2) type, with screw reverse gear and piston valves. It is electrically lighted throughout, has nickel plated cab fittings and is very handsomely finished. Beside the steel postal car built for the Chicago, Milwaukee & St. Paul by the American Car & Foundry Company, there are included in this exhibit a Southern Pacific box car equipped with the Van Dorn steel end, a gondola car with the Ditchfield door operating gear and the Standard Car Truck Company's four-point bearing flat car. There is also a flat car containing the Jacobs-Shupert and radial stay fireboxes which were used in the Coatesville tests last year, and an electric locomotive built by the General Electric Company and the American Locomotive Company for the Butte, Anaconda & Pacific.

CORNELL DINNER.

Thirty-one alumni of Cornell University and two guests met for their eighth annual dinner in Atlantic City on Friday evening at the Marlborough-Blenheim. B. P. Flory, '95, superintendent of motive power, New York, Ontario & Western, presided as president. Songs, stories and a discussion of educational policies in connection with training for a railroad career enlivened the meeting. It was decided to invite a representative of the faculty of Sibley college to address the meeting in 1914. C. P. Storrs, '95, Storrs Mica Company, was elected president for the next year. The success of the meeting was largely due to the activity of A. S. Lewis, Cleveland-Chicago Car Roofing Company.

The following were present: B. P. Flory, '95, president, superintendent of motive power, New York, Ontario and Western; F. F. Gaines, '95, superintendent of motive power, Central Railroad of Georgia; R. L. Gorden, '95, Standard Steel Car Company; F. M. Whyte, '89, Hutchins Car Roofing Company; A. S. Lewis, '02, Chicago-Cleveland Car Roofing Company; R. S. Cooper, '03, Independent Pneumatic Tool Company; H. A. Rogers, '03, Woven Steel Hose and Rubber Company; G. W. Ristine, Jr., '01, Pressed Steel Car Company; H. H. Gilbert, '07, Pressed Steel Car Company; F. L. Siryer, '03, North Western Malleable Iron Company; F. H. Park, '92, Westinghouse Air Brake Company; J. N. Mowery, '99, Keystone Lubricating Company; C. D. Young, '02, Engineer of Tests, Pennsylvania; C. B. Goodspeed, '08, Buckeye Steel Castings Company; J. H. Mitchell, '96, Pressed Steel Car Company; E. A. Averill, '00, *Railway Age Gazette;* G. T. Johnson, '06, Buckeye Steel Castings Company; L. B. Jones, '04, assistant engineer of motive power, Pennsylvania Lines West; F. N. Bard, '04, Barco Brass and Joint Company; E. B. Clark, '94, Celfor Tool Company; J. H. Wynne, '98, American Locomotive Company; L. H. Snyder, '06, Dixon Graphite Company; W. E. Dunham, '95, supervisor motive power and machinery, Chicago & North Western; A. R. Ayres, '00, General mechanical engineer, New York Central Lines; G. S. Goodwin, '99, mechanical engineer, Chicago, Rock Island & Pacific; C. P. Storrs, '95, Storrs Mica Company; R. R. Harrison, '08, Watson Stillman Company; Walter Smith, '08, Delaware & Hudson; A. C. Morgan, '90, Chicago Varnish Company; J. F. DeVoy, '93, assistant superintendent of motive power, Chicago, Milwaukee & St. Paul; W. G. Ransome, '99, The Bettendorf Company. The guests were T. R. Cook, Wisconsin, '00, assistant engineer of motive power, Pennsylvania Lines West, and J. H. Thomas, Standard Paint Company.

PAST PRESIDENTS, M. C. B. ASSOCIATION.

I. W. Van Houten	1867-68-69, 1873
F. D. Adams	1870-1871
M. C. Andrews	1872
Leander Garey	1874-1885
B. K. Verbryck	1885-1887
Wm. McWood	1887-1890
Jno. Kirby	1891-1893
E. W. Grieves	1893-1895
J. S. Lentz	1895-1897
S. A. Crone	1897-1899
C. A. Schroyer	1899-1900
J. T. Chamberlain	1900-1901
J. J. Hennessey	1901-1902
J. W. Marden	1902-1903
F. W. Brazier	1903-1904
W. P. Appleyard	1904-1905
J. E. Buker	1905-1906
W. E. Fowler	1906-1907
G. N. Dow	1907-1908
R. F. McKenna	1908-1909
F. H. Clark	1909-1910
T. H. Curtis	1910-1911
Alexander Stewart	1911-1912

DEATH OF ANDREW S. CROZIER.

Andrew S. Crozier, attached to the New York office of the American Steel Foundries as salesman, died suddenly of heart failure in the room of his hotel at Atlantic City Saturday evening. Mr. Crozier seemed to be in his usual good health during the day. He retired to his room in the early evening to dress for a dinner engagement, but did not appear at the appointed time. He was found lying on his bed and a hastily summoned physician pronounced him dead.

Mr. Crozier had been associated with the American Steel Castings Company and its successor, the American Steel Foundries, for the past sixteen years. He came from a fine Philadelphia family and was always highly regarded in business and social circles. He had never married. He was born at Rockdale, Pa., March 16, 1863. He was a member of several societies. He was a Mason, a Shriner, a member of the Camp Bradbury Sons of Veterans, a member of the Machinery Club, the Railroad Club in New York and the New England Railway Club. His brothers, William M. and H. D. Crozier, took the body to Ridley Park, Pa., where the funeral services were held.

PENNSYLVANIA SHOPMEN GIVE BAND CONCERT.

A band concert was given yesterday morning and afternoon in the entrance hall of the Million Dollar Pier by the Enola Pennsylvania Railroad Y. M. C. A. band, composed

entirely of shopmen employed by the Pennsylvania Railroad at the Enola shops.

The band was organized about four years ago with 15 pieces and has since been increased to 45 pieces. It has played every year at the principal conventions in the state of Pennsylvania and has given many special concerts. Supported by the Y. M. C. A. at Enola, it is now almost self sustaining, receiving no assistance from the railroad company except free transportation. The band was organized by H. G. Hassler, now president and general manager of the band, who is foreman of the car shops at Enola and much of its success is due to his efforts. Enola is a town of 1500 inhabitants and no other town of its size in the state has a band of its size and quality. The band is directed by George F. Tyrrell, a retired army officer.

MIKADOS FOR THE LEHIGH VALLEY.

The first Mikado locomotives built by the Baldwin Locomotive Works for the Lehigh Valley were put in service in 1903. These engines were equipped with balanced slide valves and Stephenson link motion, and used saturated steam. The road has recently received, from the same builders, 17 locomotives of the same type which use superheated steam, and are equipped with piston valves, and Walschaert gear. They are large engines of their type, and represent a decided increase in capacity over the previous ones.

Powerful Slow Speed Freight Locomotives; Lehigh Valley.

The total equivalent heating surface of the new locomotives, according to the usual method of calculation, is 6472 sq. ft. For an increase in total weight of 38 per cent., there is an increase in tractive effort of 33 per cent. and of total heating surface of 81 per cent. The ratio of tractive effort to total heating surface is 12.2 for the design of 1903, and 8.95 for the new engines. This represents an increase in relative steaming capacity of 36 per cent.

The locomotives illustrated have a ratio of adhesion of 4.02 and with driving wheels 56 in. in diameter they are especially suitable for heavy, slow speed service. As previously indicated, however, the boiler power is relatively high, and the design is suitable for long hard runs where there is a constant demand for steam.

The boiler has an extended wagon top, and the firebox is of the modified Wootten type without a combustion chamber. It is exceptionally large, as the depth, in front, is 87½ in., while the grate area is 100 sq. ft., and the firebox heating surface 274 sq. ft. In the design of 1903, the front end of the firebox was immediately over the rear pair of driving-wheels; but in the new locomotives the box is back of the wheels, and full advantage has been taken of the opportunity to gain depth. The sides and crown are of 5-16 in. plate, in one piece. The sides and roof of the outside box are also in one piece, the thickness being ½ in. The fuel used is a mixture of bituminous coal and fine anthracite, and it is fired through two circular doors which are placed 38 in. apart transversely. The grate is composed of table bars, arranged in three groups, supported at the sides of the firebox and on two intermediate longitudinal bearers. The bars of each group rock in three sections. No drop plates or water bars are used with this arrangement.

The front end of the firebox crown is supported from two T-bars hung on expansion links. All the staybolts in the throat, with the exception of those in the bottom horizontal row, are flexible; no flexible bolts are used in the sides or back. The small boiler tubes are spaced with ¾ in. bridges. The superheater is unusually large, is of the Schmidt top-header type, with 43 elements, and provides 1101 sq. ft. of superheating surface. Steam is conveyed to the steam chests through outside pipes.

The cylinders are bushed and are fitted with circulating and vacuum relief valves. The steam distribution is controlled by 14-in. piston valves; these are driven by the Walschaert gear, and are set with a lead of 5-16 in. The link and reverse shaft bearings, on each side of the locomotive, are combined in a steel casting which is bolted to the guide yoke. The Ragonnet power gear is applied, the cylinder being bolted to the boiler barrel forward of the firebox. Contrary to the usual practice in locomotives with Wootten fireboxes, the cab is placed at the rear end. The furnace is of such width that it would be difficult to locate a hand reverse lever in a convenient position, but by employing the Ragonnet gear the lever can be mounted on a bracket bolted to the back head of the boiler. Such an arrangement is convenient for the engineman, while it leaves room for a satisfactory grouping of cab fittings.

The frames are of .40 carbon steel, 5½ in. wide, with single front extensions measuring 11 in. deep under the cylinders. The equalization system divides between the second and third pairs of driving-wheels. The spring hangers at this point are pinned to lugs which are cast on a wide frame brace. Strong transverse bracing is also placed at the second and third pairs of driving-pedestals, and under the front end of the firebox, where the rear frames are spliced to the main frames. The brace here carries the radius-bar pin for the back engine truck, and also supports the expansion plate for the mud-ring. The rear truck is of the Rushton type, with inside journals. The spring rigging is arranged with six leaf springs on each side, one being over each driving-box, and one in front and one in the rear of the trailing truck. This provides ample spring support at the rear end, and should insure easy riding.

These locomotives were built in accordance with specifications and drawings prepared by the Railroad company. They have been specially designed to meet conditions existing on the heavy grade sections of the line, and, where practicable, use details

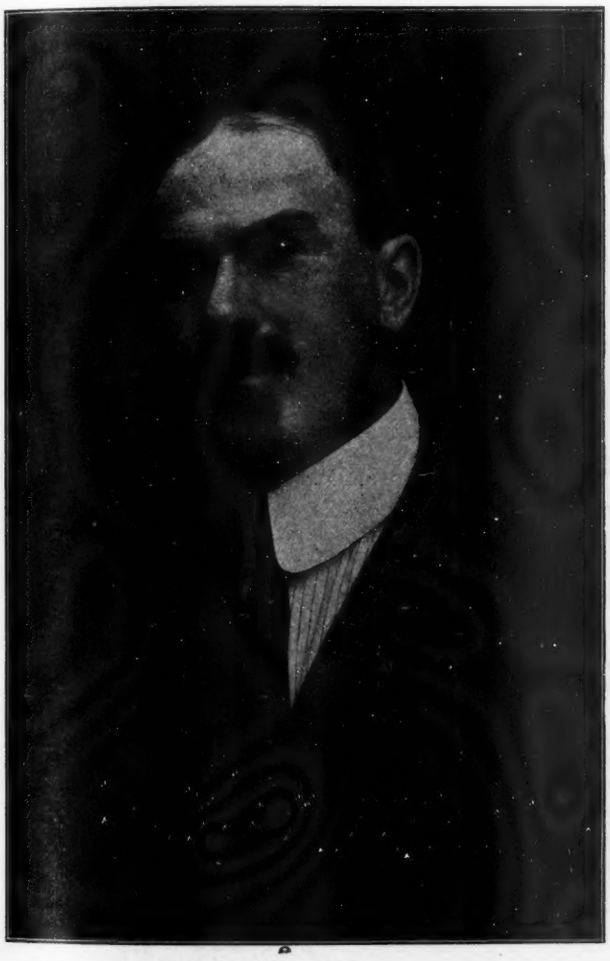
interchangeable with those of locomotives previously built. They constitute an interesting step in the development of eight-coupled anthracite burning locomotives.

Some of the principal dimensions are given in the following table:

Cylinders, diameter and stroke	27 in. x 30 in.
Driving wheels, diameter	56 in.
Driving journals	9 in. x 14 in.
Steam pressure	175 lbs.
Boiler, diameter	83¾ in.
Tubes, number and diameter	264—2¼ in.
Flues, number and diameter	43—5½ in.
Length of tubes and flues	21 ft.
Heating surface, tubes and flues	4,547 sq. ft.
Heating surface, total	4,821 sq. ft.
Grate, area	100 sq. ft
Weight, total	321,800 lbs.
Weight on drivers	232,300 lbs.

NEW VICE-PRESIDENTS OF M. M. ASSOCIATION.

Two new vice-presidents were elected at the closing session of the Master Mechanics' Association, both of whom had previously served upon the executive committee. These were E. W. Pratt, the second vice-president, who is assistant superintendent of motive power and machinery of the Chicago & North Western, and William Schlafge, the third vice-president, who is general mechanical superintendent of the Erie.



E. W. PRATT,
Newly-Elected Second Vice-President, M. M. Association.

WILLIAM SCHLAFGE,
Newly Elected Third Vice-President, M. M. Association.

Mr. Pratt was born at Fort Atkinson, Wis., on June 2, 1869. He is a graduate of the mechanical engineering department of Lehigh University. Before attending college and during his vacations he was engaged with the Chicago & North Western on field work in civil engineering and with the Elgin, Joliet & Eastern during its construction. For a short time after leaving college he was engaged in the manufacture of varnish and lubricating oils at San Francisco, Cal., and during 1890-1 was a designing engineer of the Western Electric Company at Chicago. Following this he was general superintendent of the Chicago Hardware Company for about a year, and from 1892 to 1899 was general air brake inspector of the Chicago & North Western. He has been connected with that road ever since and in the following capacities: 1899-1901, engine house foreman at Chicago; 1901-2, general foreman at Ashland, Wis.; 1903, master mechanic at Mason City, Iowa; from 1903 to January, 1909, master mechanic of the lines west of the Missouri River, with headquarters at Missouri Valley, Iowa. In January, 1909, he was made assistant superintendent of motive power and machinery, which position he now holds. Mr. Pratt became a member of the association in 1903.

William Schlafge, the new third vice-president, was born in Berlin, Germany, October 11, 1868, and after receiving a common school education continued it by attending night school. He first entered the railway service in the machine shops of the Lehigh Valley, at Packerton, Pa., and remained with that company until 1887, when he went to the Minneapolis, St. Paul & Sault Ste. Marie shops at Minneapolis as an apprentice. After finishing his apprenticeship he was engaged as a mechanic and foreman in several railway and contract shops, and in 1893 returned to the service of the Soo as an engine house foreman at Gladstone, Mich. He resigned this position in 1898 to go with the Escanaba & Lake Superior as a locomotive fireman; later he was made an engineman, and was then promoted to the position of master mechanic. He next went with the Baltimore & Ohio at Newark, Ohio, as an engine house foreman, and three years later was promoted to general foreman in charge of the locomotive and car departments, with headquarters at Chicago Junction, Ohio, remaining in that position until 1893. In March

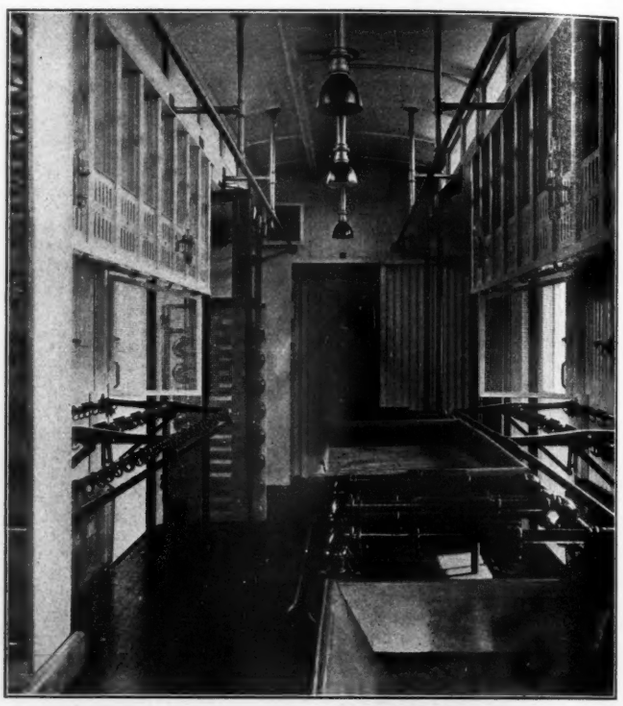
of that year he was made general foreman of the Erie at Port Jervis, N. Y., and in 1894 was made master mechanic at Jersey City, N. J. In December, 1906, he was made master car builder with headquarters at Meadville, Pa., and a few months later was promoted to the position of general master mechanic, and then to that of assistant mechanical superintendent. In October, 1907, he was made mechanical superintendent of the Erie Grand division and the New York, Susquehanna & Western, with office at Jersey City. When Mr. Rumney left the Erie early in 1912 to go with the Rock Island, Mr. Schlafge was promoted to the position of mechanical superintendent. Mr. Schlafge became a member of the Master Mechanics' Association in 1904.

STEEL POSTAL CAR.

The American Car & Foundry Company, New York, is exhibiting an all-steel postal car, built for the Chicago, Milwaukee & St. Paul. It conforms to the latest specifications of the United States post office department in construction, floor plan and interior fixtures and was among the first cars built under the specifications and approved by the post office committee. It is designed with trussed side frames to carry the load, the truss consisting of a 6 in. x 4 in. x 3/8 in. angle side sill, a 5 in. x 3 in. x 5/16 in. angle side plate, 3 in x 2 in. x 5/16 in. angle side posts and 3 in. x 2 in. x 1/4 in. angle and 4 in. 5.25 lb. channel side braces with suitable reinforcements at the side door openings.

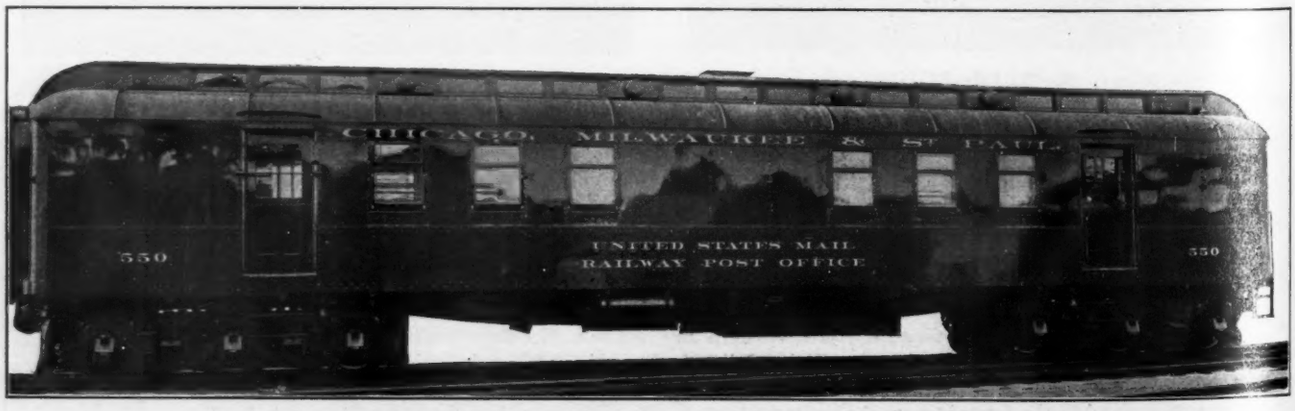
The center sills are of the fish belly type and are designed to absorb the end shock and carry the center sill loads between the bolsters and cross-bearers, from which points it is transferred to the side trusses. The center sills are 26 1/2 in. deep at the center and consist of two 5/16 in. web plates 25 1/2 in. deep, spaced 18 in. apart and reinforced by four bottom flange angles 3 in. x 3 in. x 3/8 in., two top flange angles 4 in. x 3 in. x 5/8 in. and a top cover plate 30 in. x 1/2 in. The cross-bearers are located 18 ft. 2 in. apart, and consist of a 1/4 in. web plate with a 3 in. flange at the top, a 3 in. x 3 in. x 1/4 in. angle reinforcement and a 16 in. x 1/4 in. cover plate. The bottom flange is reinforced by two 3 in. x 3 in. x 1/4 in. angles which are continuous between the side sills and pass below the center sill flange angles. The combined body bolster and platform is of steel and was furnished by the Commonwealth Steel Company. The floor beams are 3 in. 4 lb. channels riveted to the center and side sills, and the floor supports are channels of the same size and are covered with No. 14 gage steel upon which is secured 1 in. hair felt insulation; between this insulation and the floor is 1 5/16 in. air space. The floor consists of two courses of 13/16 in. floor boards nailed to stringers which are bolted to the floor supports and center sill cover plate.

The end framing is designed especially strong to prevent telescoping and consists of 12 in. 31.5 lb. I-beam vestibule posts reinforced by 4 in. 5.25 lb. channels, end door post stiffeners and a 3/16 in. pressed steel door post cover, which is screwed to wood furring. The intermediate end posts and corner posts are 4 in. 10.3 lb. Z bars and the corner post cover is a 3/16 in. pressed plate; the end sheathing is 1/8 in. plate which is riveted to all the posts. The end framing members are securely riveted in pockets cast in the combined end sill and double body bolster at the bottom, which takes care of the bottom reactions and distributes any shock throughout the longitudinal members of the underframe. At the top they are secured to a built-up end plate consisting of 1/4 in. plates and a 4 1/2 in. x 3 in. x 5/16 in. angle ramp carline which is further reinforced by a 3/8 in. anti-telescoping plate 21 13/16 in. wide, flanged at the outer side and extending from side plate to side plate to distribute the top reactions from the end posts through the longitudinal roof members.



Interior of Chicago, Milwaukee & St. Paul Steel Postal Car.

The side sheathing consists of 1/8 in. plate, spliced at the belt rail which is a 1/4 in. x 4 in. plate in a continuous length between the door openings and a 4 in. 5.25 lb. channel which is framed between the posts. The letter board is 1/8 in. plate reinforced at the bottom by a 2 in. x 2 in. x 3/16 in. angle and at the top is riveted to the side plate, the same rivets fastening a U-shaped eaves moulding to which the roof sheets are riveted. The roof is of the clere-story type and has 3 in. x 3 in. x 1/4 in. angle deck sills running the full length of the car and riveted to the carlines. The carlines are 1 3/4 in. x 1 1/4 in. x 3/16 in. angles extending from side plate to side plate in one piece



Steel Postal Car for the Chicago, Milwaukee & St. Paul.

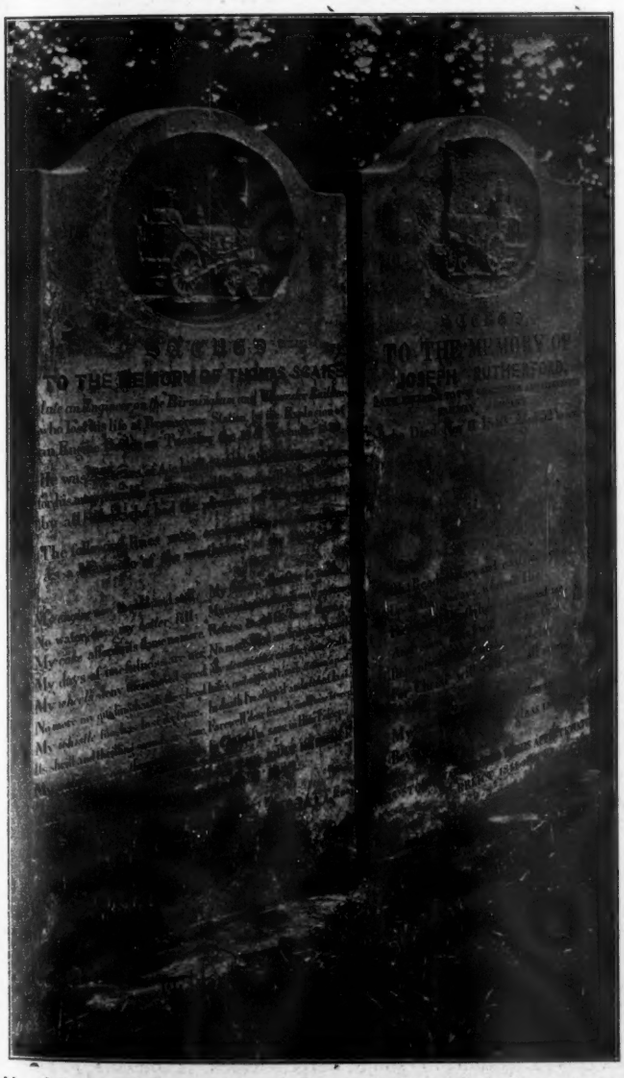
and arranged in pairs. The upper deck roof sheets are No. 14 steel, and the lower deck sheets No. 16 steel insulated with three-ply salamander which is secured by wood furring.

The interior finish of the car is entirely of steel, the sides being lined with corrugated iron. The outer window sash are removable and all sash are made of wood and provided with screens as required by the railway mail service standards; the sliding side doors are of wood, and the H. W. Johns-Manville Company's three-ply salamander insulation is applied to the inner side of all outside sheets; there is a dead air space between the sheathing and inside finish. Ventilation is obtained by 6 in. Utility ventilators. The car is lighted by electricity, the head end system of current supply being used and is also equipped with two battery boxes of 16 cells each. The principal dimensions as follows:

Length over end posts	60-ft. 10⅝ in.
Length inside	60-ft. 1 in.
Width over side sills	10-ft. ¾ in.
Width inside	9 ft. 3¾ in.
Weight of car body	80,580 lbs.
Weight of trucks	38,080 lbs.
Weight, total	118,660 lbs.

AN EARLY LOCOMOTIVE BOILER EXPLOSION.

In 1840 one of the small railways, which a few years later were combined to form the beginning of the present Midland Railway of England, purchased eight locomotives from Norris of Philadelphia. The works of Norris later became the Baldwin Locomotive Works. These engines were used on an incline between Bromsgrove and Blackwell, which had a 2.65 per cent. grade and pulled a train of 53¼ tons weight at a speed of 8½ miles an hour. They were of the single driver, inclined cylinder type with a four wheel truck.



Headstones of Engineer and Fireman Killed in a Locomotive Boiler Explosion in 1840.

Shortly after they were put in service, the boiler of one of these exploded, killing the engineer and fireman. These men were probably the first enginemen to be killed by a locomotive boiler explosion. They were buried side by side in a church yard in Bromsgrove, and the friends of the engineer erected a suitable headstone at his grave, on which was carved a reproduction of the locomotive he was driving when killed. This action aroused the friends of the firemen to a similar action.

A short time ago Mr. Fowler, chief mechanical engineer of the Midland, heard that these stones were showing signs of disintegration and he hastened to have photographs of them made. He brought copies of these pictures with him to the convention and the accompanying reproduction is made with his permission.

The inscription on the engineer's headstone reads as follows:

"Sacred to the memory of Thomas Scaife, late engineer on the Birmingham & Gloucester Railway, who lost his life at Bromsgrove Station by the explosion of an engine boiler on Tuesday, November 10, 1840. He was 28 years of age, highly esteemed by his fellow workmen for his many amiable qualities, and his death will be long lamented by all those who had the pleasure of his acquaintance. The following lines were composed by an unknown friend as a memento of the worthiness of the deceased:

"My *engine* now is cold and still,
No water does my *boiler* fill,
My *coke* affords its flame no more,
My days of usefulness are o'er.
My *wheels* deny their noted speed,
No more my guiding hand they heed.
My *whistle* too has lost its tone,
Its shrill and thrilling sounds are gone,
My *valves* are now thrown open wide,
My *flanges* all refuse to guide.
My *clacks*, also, though once so strong,
Refuse to aid the busy throng.
No more I feel each urging breath,
My *steam* is now condensed in death.
Life's *railways* o'er each *station's* past,
In death I'm stopp'd and rest at last,
Farewell dear friends and cease to weep,
In Christ I'm safe, in Him I sleep."

"This stone was erected at the joint expense of his fellow workmen in 1842."

The inscription on the other stone reads:

"Sacred to the memory of Joseph Rutherford, late engineer to the Birmingham & Gloucester Railway Company, who died November 11, 1840; age 52 years.

"Oh! reader stay and cast an eye
Upon this grave wherein I lie,
For cruel death has challenged me,
And soon, alas! will call on thee.
Repent in time, make no delay,
For Christ will call you all away.
My time was spent like days in sun,
Beyond all cure my glass is run.

"This stone was erected by his affectionate relict, 1841."

MILITARY RAILWAY IN MONGOLIA.—Russia has constructed a military railway from Harkatu to Urga and the whole line is divided into four sections, on each of which a barrack has been erected.

NEW RAILWAY IN CHINA.—The railway built by Chinese engineers, and financed by the Chinese themselves, which will connect Pak Kaai, province of Kwangtung, the port on one of the largest branches of the Canton river with Hong-Kong is now opened for traffic as far as the city of Kongmun, which is only three miles from Pak Kaai.

LITTLE INTERVIEWS.

"Compounding has not been entirely discarded, although its use is not being noticeably extended. The railways already having large numbers of compounds are finding them satisfactory. One of the most interesting developments in this connection is the application of a superheater to a three-cylinder, four-coupled locomotive by Mr. Fowler, of the Midland. While this engine is not yet in service the general opinion of locomotive engineers in England is that it will be a very successful combination."

"I hope to see the time," said M. Waitt the other day, "when the railways of the United States will to some extent follow the example of those of Europe in the interior arrangement of their day coaches and sleeping cars. The day coaches in Europe are divided into compartments seating four or more persons, instead of being simply one large compartment, as ours are. This makes far much greater privacy. It promotes more satisfactory ventilation, because it is easier to ventilate a compartment satisfactorily to a few people than a big car satisfactorily to a large number of people. It also enables one to choose his company. The argument for the division of sleeping cars into compartments is much stronger still. European travelers regard our large, open sleeping cars as little short of indecent. The man who travels much in Europe soon gets to sympathizing with their point of view."

"I think the exhibits in connection with these conventions have an educational value beyond what most people realize," said James Ogilvie, assistant chief operating officer of the Board of Railway Commissioners of Canada, on Saturday. Mr. Ogilvie is attending the conventions and is staying at the Traymore. "I have been attending the meetings of the mechanical associations for many years," he continued, "and it seems to me that the usefulness both of their sessions and of the exhibition increases steadily year by year. I believe it would pay the railways to bear the expenses of their mechanical men, if that were necessary to get them to come here, and should then make it their duty carefully to inspect every new or improved theory shown. Any mechanical officer who comes here and does not carefully inspect the exhibit makes a great mistake."

Mr. Ogilvie was for twenty-three years superintendent of motive power of the Canada Atlantic, now a part of the Grand Trunk. Following the acquisition of the Canada Atlantic by the Grand Trunk he was master mechanic of the latter road at Port Huron. E. J. Chamberlin, now president of the Grand Trunk, was then its general manager. Mr. Ogilvie was at one time connected with the Canadian Pacific, and had charge of equipping its first shops at Montreal. In his present position he deals for the Canadian Commission, with the regulation of safety appliances, boiler inspection, etc. He has been with the Commission since 1907.

The dinner to be given the Brazilian Minister of Foreign Affairs in New York on June 17 by the American Manufacturers' Export Association which is composed largely of railway supply manufacturers, calls attention forcibly to the opportunities that exist for increasing the foreign market for railway equipment and supplies made in this country. Among the supply men attending the conventions who recently have been abroad trying to broaden the foreign market for their companies is J. Will Johnson, general manager of the Pyle-National Electric Headlight Company. Mr. Johnson spent two months in the late summer of 1912 in Norway and Sweden.

"I don't think we fully appreciate in this country how much, with a reasonable amount of effort and expenditure, we could increase our foreign sales of supplies," said Mr. Johnson this week. "The managements of the railways of Norway and Sweden could gain by introducing the kind of automatic couplers used in this country. Other things, it occurred to me, they could well afford to borrow from us, are some of our types of derails and curtain fixtures. On the other hand, it would be a mistake to assume that we have nothing to learn from the manufacturers and railway managers of other countries. The American visitor in Europe is impressed with the fact that the Europeans avail themselves of many refinements of design and practice which we might profitably imitate. In many respects our railways are superior to those of Norway and Sweden; but I rode 66 miles in 44 minutes on a locomotive on the Swedish State Railways near Stockholm, which shows that they can 'go some' over there."

Lawford H. Fry, the European representative of the Baldwin Locomotive Works, who is visiting the conventions for the first time since 1906, has been particularly interested in the reports and discussion in connection with superheated steam.

"The railways in England," Mr. Fry says, "are all showing much activity in the investigation of this subject, and all of the larger systems are applying superheaters. The fire tube type is being universally used, but several of the roads are trying designs originated by their own engineers. These differ principally in the arrangement of the headers and the method of fastening the pipes. The advantage of the higher degrees of superheat is generally admitted, and most of the designs closely follow the general plan of the Schmidt type, universally used here.

"There is still but one Pacific type locomotive in Great Britain, the 'Great Bear' of the Great Western, and there is but little demand for this type in that country, although there is a constant tendency for the weight of passenger trains to increase. The ten-wheeler is the most popular type for heavy passenger traffic, and probably will be able to meet the demands for some time to come. The very large locomotive will always be forbidden in England because of the small size of the loading gage.

"In freight service there appears no tendency toward larger cars except in exceptional instances. The ten-ton, four-wheel car seems to suit the traffic requirements perfectly. Nearly all freight traffic is high speed, and the heavy, slow "drags" so common here are found in only a few instances. In view of this condition the eight-coupled locomotive is the most suitable, and is generally designed without a front truck, although there are a few examples of the consolidation type in use.

"The Interstate Commerce Commission heartily approves these meetings," said George B. McGinty, secretary of the commission, who has been an interested visitor at the convention throughout the week with several of the locomotive boiler inspectors of the commission. "The railroads have in their hands right now in these meetings the power of preventing further legislation along the lines of standardization. If the Master Mechanics' and Master Car Builders' associations adopt standards wherever they see plainly they are needed, and if the managements of the roads will adhere to the standards adopted, they will prevent public agitation and preclude the people from demanding legislation by Congress which will place additional burdens on the Interstate Commerce Commission to enforce. There is no reason why the commission should be made to bring about standardization when the carriers have it in their own power to do it, and if the roads will only back up the work that is done here by the associations by adopting their conclusions they can forestall legislation on the subject.

"We are gratified to find that the railroad men themselves are giving our inspectors such coöperation. It is rare to meet a master mechanic or a superintendent of motive power who does not give us all the assistance in his power.

"Occasionally we find one who fails to understand our intentions and methods and who objects if one of our inspectors calls his attention to some defect which is outside of our authority. We try to make them understand that we are not anxious to order engines out of service, but that it is our

purpose, so far as possible, to call attention in an informal way to matters that can be remedied so that they may be cared for before they have a chance to make trouble. If we call attention to a defect, even if it is outside of our authority, and if it is not remedied and an accident ensues, it is, of course, our duty to report that we had called attention to it in advance. When the railroad men understand us we are sure of their coöperation. But they should remember that the commission does not make the laws. It is only required to enforce them and if the carriers had adopted proper standards themselves the laws would not be there for us to enforce them."

A REMARKABLE CAREER AS LOCOMOTIVE ENGINEER.

Among the special guests at the convention is A. Chambers, who retired from the service of the Pennsylvania Railroad on a pension two years ago, at the age of 68, after 51 years of continuous service. For the last 46 years of that time Mr. Chambers was a locomotive engineer and ran his engines over almost the entire system of the Pennsylvania as well as over a number of other roads on special trips. During most of his service he has been assigned to the duty of handling the locomotive on special and inspection trips of the presidents and general managers. He has hauled six Pennsylvania presidents, J. Edgar Thomson, Thomas A. Scott, George B. Roberts, Frank Thomson, A. J. Cassatt and James McCrea, as well as the present president, Samuel Rea, before he was elected to that office, and has attended the funerals of the six former presidents. He also for 39 years presided at the throttle for eight general managers on inspection trips, A. J. Cassatt, Frank Thomson, C. E. Pugh, S. M. Prevost, J. B. Hutchison, W. W. Atterbury, W. H. Myers and S. C. Long.

Left to right—A. Chambers, Retired Pennsylvania Engineer, and W. H. Bennett, Master Mechanic, Juniata Shops, Pennsylvania.

Mr. Chambers ran the locomotive on the special trains of Presidents Grant, Hayes, Cleveland, McKinley and Roosevelt, and also the Duke of Sutherland, as well as the special train of the Centennial Commissioners in 1876. In that year he was the engineer on the first division of a run made by a special train from Jersey City to San Francisco in 83 hours, his part of the run being from Jersey City to Pittsburgh without stops.

In his entire career as an engineman Mr. Chambers never had an accident and never lost a day through sickness.

He now has two sons in the Pennsylvania service and his father before him was a track supervisor for the same road. Mr. Chambers entered the service in 1861, carrying water for the track gangs when he was 16, and later was made fireman on a wood-burning engine. He was promoted to engineman in 1868 and in 1871 to a passenger run. He continued as a passenger engineer until his retirement on January 1, 1912. For many years his regular run was on the Cincinnati Express from Philadelphia to Harrisburg, except when he was assigned to special trains. Later he ran locals on the Philadelphia division.

Mr. Chambers made his fortieth trip on the general manager's inspection last year in a private car by special invitation from General Manager Long. He has been personally acquainted with all of the presidents and general managers during his period of service as well as the directors who went on the inspection trips and always had a good word for him. A. J. Cassatt was general manager when he entered service, and he remembers James McCrea as a supervisor. One of his first special trips was in 1876 with Col. Scott from Philadelphia to St. Louis.

Mr Chambers has witnessed some wonderful changes in railroading in his time. He thinks the work is much safer now, with signals and other modern appliances, but that it is also more of a strain on a man on account of the higher speed and the greater volume of traffic. His first engine was type "G," with 15 in. x 22 in. cylinders, and 54-in. drive wheels. His last had 18 in. x 26 in. cylinders and 68-in. wheels. He claims to have had the "cleanest engine in the United States," all nickel work, with a cab as neat as a Pullman. It was kept in a special house to be used only on special trips. He wore out four engines in this special service, retaining the same number "937" throughout. The last "937" was new in 1906.

Mr. Chambers is now living at Atlantic City, taking it easy on his liberal pension. He does not look his age and walks for at least an hour every day on the Boardwalk for exercise. He has been bringing officers to the conventions for many years and since his retirement has been a daily visitor to the exhibits where he meets many old friends.

Tokaido Line, Japan.—The construction of the iron bridge with the double line over the Kiso river having been completed the section will be put into active use for traffic immediately. Now the only single track section of the Tokaido line left is the iron bridge over the river Tenryu.

The Amur Railway, Siberia.—The Czar of Russia has addressed to the Governor-General of the Amur Region a message of congratulation on the progress of construction of the Amur Railway, and has expressed his thanks to all Russians engaged on the works. Credits amounting to over $375,000,000 have been voted for this enterprise during the last five years. The railway is expected to be completed in 1915, or, at latest, in 1916. The section as far as Blagoveshchensk will probably be opened for traffic in the course of this year.

Arisan Line, Fokmosa.—The Arisan railway is one of the most interesting lines in Formosa, and it might almost be said in the Far East. The line was undertaken by the Arisan Works Department of the government of Formosa, and a well-informed critic observes that this mountain railway will elicit favorable remark from the engineering fraternity in many countries. The construction involved steep gradients, sharp curves, a picturesque spiral, and many tunnels and bridges. The entire railway will cover 41 miles, from Kagi to Mount Ari Station—the latter point being 7,000 ft. above sea level. From Kagi to Chikutoki, 9 miles, the grade is two per cent. From Chikutoki, Nimandaira is reached after a 32-mile zigzag climb up the mountains to 7,000 ft., the gradient being five per cent. Nearly the entire line is sinuous, the sharpest curve being 35 degrees. To reach Nimandaira the railway must circle a peak spiral fashion. The spiral construction begins at 1,824 ft. and ends at an elevation of 2,500 ft. Between Kagi and Mount Ari there are 70 bridges, 73 tunnels, and almost innumerable cuts. The Rinnai or forest railway is 18 miles long, is tortuous, and has a gradient of six per cent. This railroad is called the Mount Arisan line, Mount Ari lending its name to the railway as well as to the giant forests that are the objective point of the undertaking.

Conventionalities.

The "movies" on the Pier are mighty popular all day.

The superheater white pants have plenty of company now.

O. C. Gayley, vice-president of the Pressed Steel Car Company, arrived Friday evening. He is staying at the Marlborough-Blenheim.

News of the death in Chicago on Friday of Mrs. A. E. Buffum, mother of Mrs. Mark A. Ross, was received by Mr. Ross late Friday evening.

J. French Miller, secretary of the Galena Signal Oil Company, dropped in Saturday, but found it necessary to return to Franklin Sunday.

Vernon Job, manager of the Pacific Coast territory of the Independent Pneumatic Tool Company, is paying his first visit to the M. M. and M. C. B. conventions.

F. H. Clark, general superintendent of motive power of the Baltimore & Ohio, was here a short time for the M. M. Convention, and has returned for the M. C. B. Convention. He is at the Marlborough-Blenheim.

When the *Daily* said in its issue of June 14 that Mrs. J. M. Hopkins and J. M., Jr., were traveling it meant to tell also where they were traveling, but failed to do so. They have been in Europe for some months.

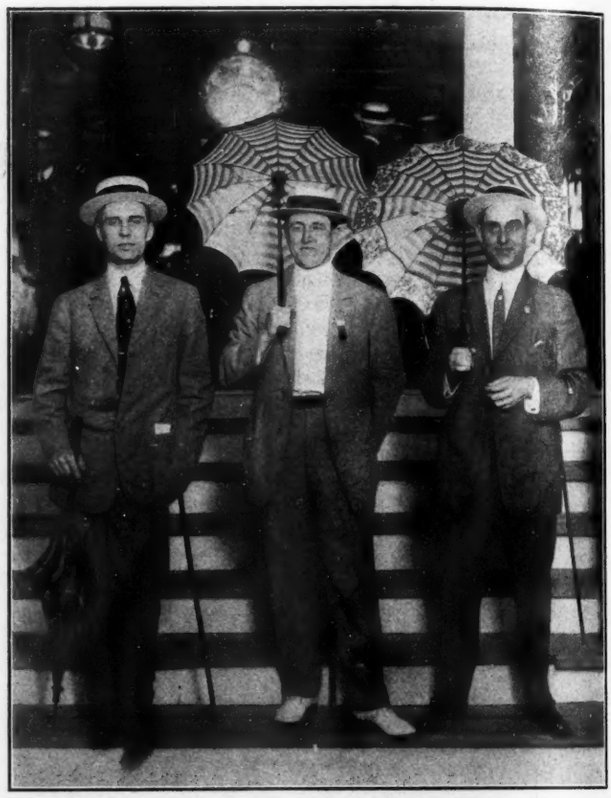
"Votes for Women"—Convention Ladies who on Wednesday Last Rejoiced in the News of the Passage of the Illinois Suffrage Bill.

Top row, left to right—Mrs. Charles D. Jenks, Mrs. Burton W. Mudge, Mrs. W. J. Tollerton, Mrs. L. A. Richardson, Mrs. J. S. Sheafe.

Bottom row, left to right—Mrs. B. A. Clements, Mrs. F. O. Bunnell, Mrs. J. P. Landreth.

On Saturday morning Chairman Yardley, of the enrollment committee, was presented by the members of his committee with a handsome stickpin—a sapphire surrounded by four diamonds. E. T. Sawyer, a member of the committee, made the presentation.

Blake C. Howard, who has attended the conventions during the past three or four years with his father George E. of the Commonwealth Steel Company arrived Sunday afternoon. This year he comes as the St. Louis representative of Mudge & Company.



"Votes for Women"—Compelled to Smile when the News was Received from Illinois.

Left to righ—J. S. Sheafe, Eng. of Tests, Illinois Central; J. P. Landreth, Chicago Manager Garloch Packing Company; E. A. Park, Supt. Motive Power & Equipment, Peoria & Pekin Union.

T. H. Goodnow at the time of the Conventions last year was with the Armour Car Lines. This year he comes as superintendent of the Car department of the Chicago & Northwestern. Mr. Goodnow was last year's president of the Western Railway Club.

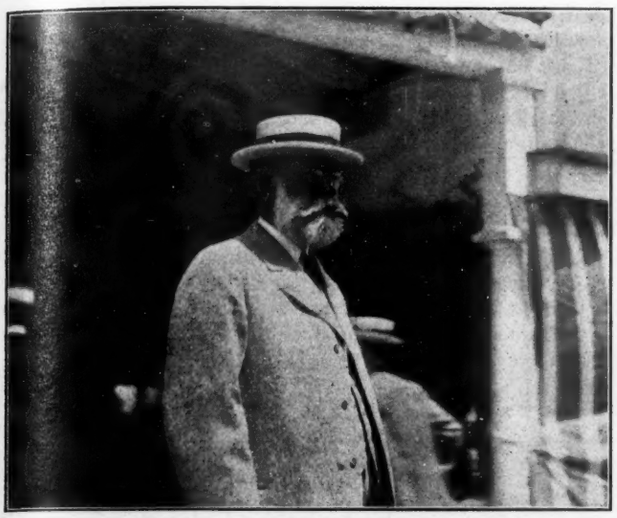
David J. Champion, vice-president and general manager of the Champion Rivet Company, more familiarly known as "Dave" Champion, is unable to get to the convention this year. He is compelled to stick close to the new plant of the company at East Chicago, soon to be put in operation.

J. E. Muhlfeld, formerly general superintendent of motive power of the Baltimore & Ohio, and later vice-president of the Kansas City Southern, is attending the conventions this year. He is now located in New York City and is engaged in special and consulting work.

R. A. Bachman, vice-president and general manager of the Edison Storage Battery Co., motored down from New York the latter part of the week and is stopping at the Dennis. Mr. Bachman has just bought a new National and is taking considerable pleasure in feeling its pulse.

George Durham, master mechanic of the Delaware, Lackawanna & Hudson at Scranton, Pa., is among the Lackawanna representatives at Atlantic City this year. The superheater slide valve locomotive which is giving such successful service on that road is operating on his division.

We miss the smiling face—and box of cigars—of our friend Stephen C. Mason, secretary of The McConway & Torley Company. In writing about his inability to be here because of press-



W. C. Arp, Superintendent Motive Power, Vandalia.

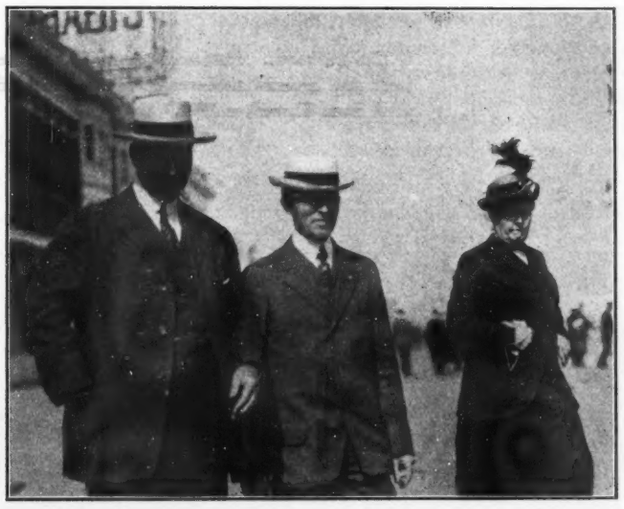
ing business engagements, Mr. Mason says, "It goes without saying that I hope the conventions will be fully up to their previous mark."

Maham H. Haig, mechanical engineer of the Santa Fe, has the reputation this year of giving more earnest and conscientious attention to the exhibits on the pier than any other railroad representative present. If there is anything

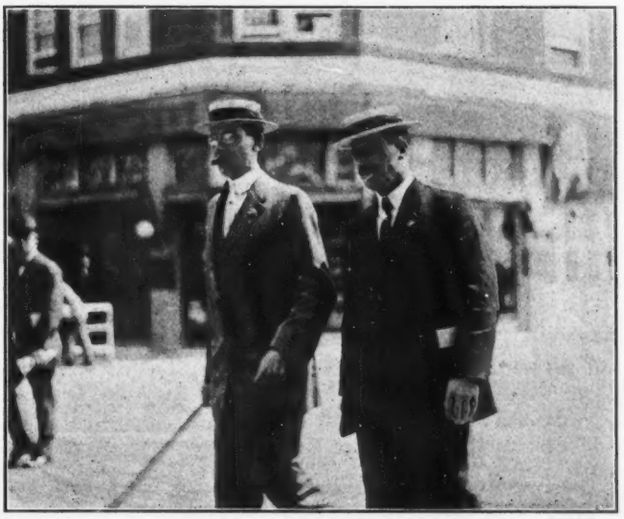
W. J. Tollerton, General Mechanical Superintendent, Rock Island Lines, and Mrs. Tollerton.

that he does not know about it when he returns home it will not be his fault.

Among the Rock Island men in attendance at the convention is W. J. Hartman, general air brake instructor. He is especially interested just at this time in the application of high speed brakes to the passenger equipment and in the inspection of a number of new locomotives which are being built for his company.



Left to right—T. Rumney and A. B. Appler, Mechanical Engineers, Delaware & Hudson Company



Left to right—John E. Davis, M. M., Hocking Valley; H. F. Staley, M. M., Carolina, Clinchfield & Ohio.

Another Good Railway Man Gone Wrong—W. H. Foster (on the Left) Until Recently Master Mechanic of the N. Y. C. & H. R. R. R., Now With the Ashton Valve Company, and N. A. Campbell.

A. M. Darlow is probably the youngest superintendent of motive power in attendance at the conventions. During the past year he was promoted to that position on the Buffalo & Susquehanna. Previously he had been mechanical engineer and general storekeeper of that road. He was graduated from Cornell in 1906.

W. S. Butler, master mechanic, and H. M. Brown, shop superintendent of the Chesapeake and Ohio at Huntington, W. Va.,

George B. McGinty, Secretary Interstate Commerce Commission.

are taking in the conventions together. During the recent floods on the Ohio river, the water reached a height of several feet in the Huntington shops, and Mr. Brown had a staff of men engaged in building boats for use in getting about the plant.

C. B. Smith, mechanical engineer of the Boston & Maine, found it necessary to return to Boston Saturday evening. He was accompanied by Mrs. Smith. Mr. Smith has had an exceptionally interesting piece of work during the past

Left to right—H. W. Coddington, Engineer of Tests, and John A. Pilcher, Mechanical Engineer, Norfolk & Western.

year in connection with the building and equipment of the new shops at Billerica, Mass.

William Smith, formerly foreman of the North Western at Boone, Iowa, and now with the Delaware & Hudson at Watervliet, N. Y., spent a couple of days at Atlantic City, going home Saturday evening. He has just completed a report on Engine House Efficiency which is to be presented at the annual meeting of the International Railway General Foreman's Association at Chicago in July.

In Chicago the street sweepers wear small lamps on their hats so that drivers of carriages and automobiles will not run them down. It was suggested Saturday morning that George Bourne might have made himself still more conspicuous in his superheater suit if he had arranged with Ostby for an acetylene headlight.

J. S. Turner, of the Pressed Steel Car Company, packed his trunk, locked it, and put the key somewhere. The trunk got here all right; but the key didn't. Now Jack isn't given to swearing. He is, however, characteristically original in his expressions; and "they" say that the amusement he afforded pending the arrival of a locksmith put Barnum & Bailey's clowns in the shade.

R. W. Burnett, general master car builder of the Canadian Pacific, arrived with Mrs. Burnett on Saturday morning. The developing and building of steel passenger cars, improvements in box car construction and extensive additions to the car building plant at Angus are among the more important features of the work in the car department of the Canadian Pacific during the past year.

James Powell, chief draughtsman of the Grand Trunk and

F. O. Bunnell, Engineer of Tests, Rock Island Lines.

secretary of the Canadian Railway Club, is attending the conventions. The Grand Trunk has been noted for its use of two-cylinder compound locomotives, and a number of the consolidation type have been replaced by single-expansion Mikados equipped with superheaters. The Mikados are reported to be giving excellent service in heavy freight service.

Daniel Royse, assistant to W. V. S. Thorne, vice-president and director of purchases of the Union Pacific system, arrived yesterday and began early a tour of inspection of the exhibits. To those who know him, it is almost needless to say that he and John C. Whitridge of the Buckeye Steel Castings Company were together. Messrs. Royse and Whitridge formerly were associated when both were in technical newspaper work.

J. F. Prendergast, master mechanic of the East Broad Top Railroad & Coal Co., is stopping at Haddon Hall. He is quite enthusiastic about the service which is being given by the Mikado locomotives which his road recently received from the Baldwin Locomotive Works, and the all-steel hopper cars which were built by the Pressed Steel Car Co. The East Broad Top is a narrow gage road and undoubtedly the only one with as modern and up-to-date equipment as that which has lately been put in service.

Lawford H. Fry, European representative of the Baldwin Locomotive Works, is attending the convention for the first time since 1906. Mr. Fry has, during the past few years, published in the *Engineer* and *Engineering* of London some exceptionally valuable articles on locomotive proportions and ratios which have attracted much favorable comment. He will return to his headquarters in London in a couple of weeks.

The Michigan Central is represented this year by W. H. Flynn, superintendent of motive power, and J. A. McRae, mechanical engineer. They are about to place in service a new lot of Mikados which are the first of that type to be used on the M. C.; also some new heavy passenger powers which is similar to the standard New York Central Lines K 3 engines and is considerably heavier than any passenger power which has yet been used on that road.

George Duffey, master mechanic of the Lake Shore & Western, has complete charge of the locomotive and car departments on that road, and is especially interested in the progress of the apprenticeship work at Lima, Ohio. The apprentice school there, which is under the general direction of C. W. Cross, superintendent of apprentices of the New York Central Lines

G. I. Evans, Superintendent Angus Locomotive Shops, C. P. R.

west of Buffalo, is giving instruction to a large number of apprentices with gratifying results.

C. A. Brandt, mechanical engineer of the Big Four, has been pretty busy during the year in supervising the extensions to the freight and passenger car shops at Beech Grove, Ind., and also some additions which have been made to the locomotive shops. He is splendidly equipped for this class of work, as he was in charge of all of the shop engineer's work on the Lake Shore for several years, and is one of the few railroad men who may be classed as experts in this line.

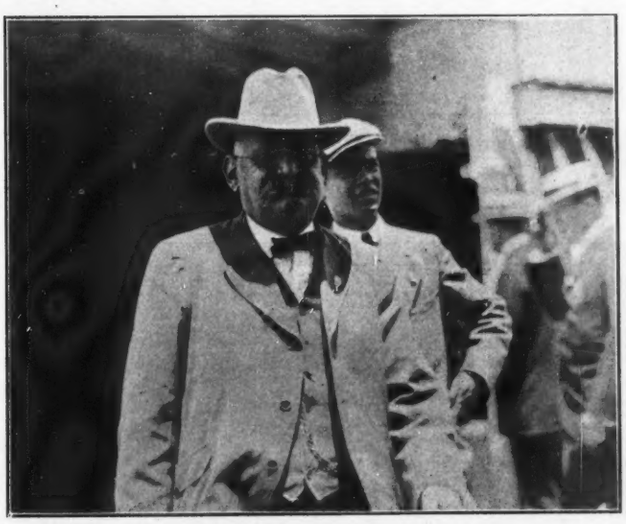
J. Leonard Replogle, vice-president of the Cambria Steel Company, and C. B. McElhany, assistant manager of sales, drove here from Johnstown, Pa., in the automobile of a friend, Mr. Stineman. Mr. Replogle had ordered a new $5,000 Stearns silent Knight touring car which he had intended to bring to Atlantic City. While still in the hands of an expert from the factory, who was testing the car, it upset on a curve and was badly damaged. Fortunately neither the expert nor Mr. Replogle's chauffeur was injured.

I. J. Justice, special inspector on the staff of F. W. Brazier, superintendent of rolling stock of the New York Central & Hudson River, is one of the two men in charge of the exhibit which is being made by the coupler committee near the end of the pier beyond the Convention Hall. He has devoted the greater part of the last six months to the work of this committee. The other representative at the exhibit is T. J. Boring, of the Pennsylvania Railroad. The courteous way in which these two gentlemen are assisting the convention attendants in getting a good idea of the features of the exhibit has been commented on by many of those who have visited it.

J. C. Currie, one of the two new members of the Executive Committee of the Railway Supply Manufacturers' Association

J. H. Manning, Superintendent of Motive Power, Delaware & Hudson Company.

from the Second District, has been with the Nathan Manufacturing Company for the last 22 years. Born in Scotland in 1851, he came over here when 19 years old and got a job in the then famous seed store of B. K. Bliss & Sons, on Park Row, New York City. Having no particular fondness for seeds, he found employment in a confectionery store. When he had got his fill of sweets, he decided to become a locomotive engineer; and in 1872 was put to work nights on a switch engine on the Pennsyl-



C. Phillips, Master Mechanic, Queen & Crescent, Meridian, Miss., and Son.

vania R. R. In 1877 he reached his goal and was given charge of a freight engine. At the time he left the Pennsylvania to go with the Nathan Manufacturing Company he had been pulling the Congressional Limited between Washington and New York for some four years. Committee work at these conventions is not new to Mr. Currie. This is his seventeenth consecutive meeting; and up to a few years ago he did a lot of active work on various committees. During one convention he was treasurer of the Finance Committee.

George F. Laughlin, General Superintendent, Armour Car Lines.

A. Buchanan, Jr., Supervisor of Equipment, New York Public Service Commission.

L. L. Yates, Superintendent Car Department, Pacific Fruit Express.

MASTER CAR BUILDERS' REGISTRATION.

Beattie, J. H., Supt., Sea Side House.
Beaumont, H. A., Gen. For. Car Shops, B. & O., Dennis.
Bentley, W. F., Master Car Builder, B. & O., Pennhurst.
Burnett, R. W., General Master Car Builder, C. P. Ry., Marlborough-Blenheim.
Chaffee, F. W., Gen. Car Insp., N. Y. C. & H. R., Dennis.
Chamberlain, E., Manager Clearing House, N. Y. C. Lines, Marlborough-Blenheim.
Coleman, Jas., Supt. Car Dept., G. T. Ry., Dennis.
Cory, C. H., Ex-Supt. M. P., C. H. & D., Dennis.
Covert, M. F., Asst. M. C. B., Swift Refr. Trans. Co., Traymore.
Cromwell, S. A., Supervisor Train Supplies & Express, B. & O., Haddon Hall.
Davis, George G., Supt. Car Dept., C. C. C. & St. L., Dunlop.
Davis, J. H., Electrical Engineer, B. & O., Glaslyn-Chatham.
Demarest, H. N., Gen. Car Insp., Penna., Traymore.
Everett, Ira, Asst. Shop Supt., Leh. Val.
Ferguson, George M., Supt. Lake Terminal, Seaside.
Fisher, W. J., Gen'l Car Insp., St. L. & S. F., Haddon Hall.
Gernert, Henry, For. Car Dept., C. of N. J., Monticello.
Gillespie, W., M. C. B., Central Vermont, Schlitz.
Goodnow, T. H., Asst. Supt. Car Dept., Marlborough-Blenheim.
Grewe, H. F., M. M., Wabash-Pittsburgh Term., Brighton.
Hennessey, J. J., M. C. B., Chicago, Milwaukee & St. Paul, Calfonte.
Jaynes, R. T., M. M., Lehigh & Hudson River, Traymore.
Kapp, W. F., Supt. Shop & Machinery, R. F. & P., Marlborough-Blenheim.
Kent, F. S., General Car Insp., Penna., Marlborough-Blenheim.
Lentz, J. S., M. C. B., Leh. Val.
Lindstrom, C. A., Chief Engineer, Pitts. Allegheny & McKees Rocks, Chelsea.
Lynn, Samuel, M. C. B., P. & L. E., Pennhurst.
McGill, A. M., Asst. S. M. P., Leh. Val., Traymore.
McIntos,h William, Retired S. M. P., C. of N. J., Galen Hall.
Manchester, H. C., Supt. M. P., Dela. Lack. & Western, Marlborough-Blenheim.
Muhlfeld, J. E., Marlborough-Blenheim.
Ord, L. C., Gen. Insp., Can. Pac., Haddon Hall.
Passmore, H. E., M. M., Toledo & Ohio Central, Dennis.
Peterson, A. F., M. C. B., Cold Blast Transportation Co., Haddon Hall.
Pfafflin, L., M. M., Indianapolis Union, Biscayne.
Phipps, J. W., M. P., Insp., B. & O., Islesworth.
Rasbridge, R. B., Chief Car Inspector, P. & R., Dennis.
Russum, T. H., Supt. Pas. Car Dept., B. & O., Dennis.
Sage, R. V., Brighton.
Schnepel, J. H., Chief Draughtsman, N. Y. C., Pennhurst.
Schultz, F. C., Chief Interchange Insp., Traymore.
Selloy, S. H., Gen. For. Car Dept., B. & A., Pennhurst.
Sheahan, J. F., Supt. M. P., A. B. & A., Strand.
Shoemaker, C. A., Gen. Supt., German-American Car Lines, Traymore.
Sitterly, W. H., Gen. Car Insp., Penna., Traymore.
Smart, G. E., Dist. Car For., Can. Pac., Traymore.
Smethurst, Thos., S. M. P. & R. S., Inter-Oceanic Ry. of Mexico, 3011 Atlantic Ave.
Smith, R. E., Gen'l Supt. M. P., Atlantic Coast Line, Chelsea.
Stewart, A., Gen'l Supt. Motive Power & Equipment, Southern, Marlborough-Blenheim.
Swanson, Charles N., Supt. Car Shops, Santa Fe, Dennis.
Sweringen, F. H., M. M., Streets Western Stable Car Line. Traymore.
Taylor, Jos. W., Secretary, M. C. B.'s Ass'n. Marlborough-Blenheim.
Thomas, W. H., Honorary Member, Dennis.
Townsend, J. F., Traf. Mgr., Lake Terminal, St. Charles.
Wymer, C. J., General Car Foreman, C. & W. I., Lexington.

MASTER MECHANICS' REGISTRATION.

Allan, Arthur, Supt. Machy., Holden Co., Traymore.
Chamberlin E., Mgr. Clearing House, N. Y. C. Lines, Marlborough-Blenhein.
Daley, W. W., M. M., N. Y. O. & W., Traymore.
Elliott, J. B., M. M., B. & O., Elberon.
Gillis, H. A., Washington, D. C., Seaside.
Kapp, W. F., Supt. M. P., R. F. & P., Marlborough-Blenheim.
McGill, A. M., Asst. S. M. P., Leh. Val., Traymore.
McIntosh, Wm., Retired S. M. P., C. of N. J.
Manchester, H. C., S. M. P., D., L. & W., Marlborough-Blenheim.

Montgomery, H., M. M., Penna., Boston.
Muhlfeld, J. E., Marlborough-Blenheim.
Passmore, H. E., Master Mechanic, T. & O. C. Ry., Dennis.
Shaehan, J. F., Supt. M. P., A., B. & A., Strand.
Smith, R. E., Gen. Supt. Motive Power, A. C. L. Ry., Chelsea.
Stewart, A., G. S. M. P. & E., Southern Ry., Marlborough-Blenheim.

MASTER CAR BUILDERS' GUESTS.

Allen, C. S., Gen. Frt. Agt., P. N. Lines, Chalfonte.
Allman, W. N., Draughtsman, M. P. Dept., B. & O., Arlington.
Alquist, N. A., Gen. Insp., M. K. & T., Haddon Hall.
Altvater, Chas. P., Gen. For. Pa., Vesta.
Baker, William S., Ch. Clerk to G. M., N. Y. C. & H. R., Haddon Hall.
Barry, Frank J., Gen. Insp., N. Y. O. & W., Traymore.
Bausman, Jno. A., Penna., Marlborough-Blenheim.
Beatty, J. R., Foreman, P. & R.
Best, J. J., Chief Clerk, Phila. & Reading, Ostend.
Beaumont, Chas. A., Ellwood.
Boome, Ammon, Engineering, A. C. R. R., Husted.
Boring, H. L., P. W. Inspector, Penna. R. R., Pennhurst.
Busse, F. W., Ch. Clerk to G. S. M. P., B. & O., Strand.
Busse, G H., Dining Car Dept., B. & O., Dorwood.
Cady, P. C., Chief Clerk, N. Y. C., 109 New Jersey Ave.
Cannon, J. M., Dis. Manager, Penna., Dunlop.
Collins, Jas. C., Gladstone.
Cooley, LeRoy, Asst. to M. P., C. R. R. of N. J., Haddon Hall.
Coyle, C. H., German-American Car Lines, Haddon Hall.
Cromwell, J. E., Insp. M. P. Dept., B. & O., Arlington.
Daley, W. W., M. M., N. Y. O. & W., Traymore.
Dally, F. M., Foreman, C. R. R. of N. J., Lexington.
Davis, H. W., Agt., Norfolk Southern, Traymore.
Davis, J. H., Elec. Engr., B. & O., Glaslyn-Chatham.
Davis, James P., Gen. Frt. Agt., McKeesport Connecting, Seaside.
Dix, Chas. S., Boilermaker, W. J. & S.
Douglas, J. M., D., L. & W., Wellsborough.
Downs, Joseph K., Engine House Foreman, P. & R., Ramsey.
Duffy, J. F., Insp., I. C. C.
Dykeman, William, Ch. Clerk Pur. Dept., N. Y. C., Haddon Hall.
Ecker, H. G., United Fruit Co. Rys., Pennhurst.
Elliot, J. B., M. M., B. & O. R. R., Elberon.
Ellis, W. M., For. Car Dept., A. G. S.
Ellsworth, G. M., Chief M. P. Clerk, Penna., Glaslyn-Chatham.
Esterbrook, W. H., Public Service Ry., Newark.
Fisher, W. J., General Car Insp., St. L. & S. F., Haddon Hall.
Flannagan, Harry, Great Northern.
Gallagher, F. S., Asst. Eng., N. Y. C., Rudolph.
Gillis, H. A., Consulting Engineer, Seaside.
Goodfellow, Jos., Foreman, Penna.
Halfert, M. W., Ch. Insp., American Ry. Assoc., Haddon Hall.
Hawk, R. R., Auditor, Cold Blast Trans. Co., Haddon Hall.
Healy, M. E., Foreman, B. & O., Willard.
Heddinger, J. W., Machinist, Penna. R. R., Pennhurst.
Hendley, C. W., Dennis.
Hill, Samuel W., Special Accountant, B. & O., Sterling.
Hinkens, E. H., Gen. For., B. & O., Dunlop.
Holtz, E. W., Supt. of Equipt., Bay State Ry. Co., Marlborough-Blenheim.
Houseman, F. V., Machinist, P. R. R., Sterling.
Hubbell, C. C., Pur. Agent, D., L. & W., Shelburne.
Jett, E. E., M. C. B., Chalfonte.
Johnson, E. E., C. C. Mech. Engr., B. & O., Arlington.
Jones, L. R., Foreman, C. R. R. of N. J., 804 Atlantic Ave.
Keen, C. G., Eng. M. W., Penna., Haddon Hall.
Keen, C. G., American Rys., Haddon Hall.
Kelly, R. J., General Foreman Car Dept., Long Island, Chalfonte.
King, John H., C. C. M. of W., N. Y. O. & W., Phillips.
Kline, D. W., Engineering, Atlantic City, Husted.
Litchfield, T. E., Draughtsman, M. P. Dept., B. & O., Islesworth.
Lively, B. F., Mgr. Lenoir Car Works, Southern, Dennis.
McCraken, J. T., M. P., Interborough R. T., Rudolf.
McKay, D. A., Pattenman, N. Y. C. & H., 109 New Jersey Ave.
McMunn, W. R., Chief Clerk S. R. S., N. Y. C. & H. R., Marlborough-Blenheim.
Maher, N. D., Vice-President, N. & W. Ry., Private Car.
Mason, J. H., Road Foreman of Engs., C. R. R. of N. J., Lyric.
Maurer, W. R., M. E., N. Y. N. H. & H. R., Haddon Hall.
Merkel, A. L., Foreman, A. C.
Montgomery, H., M. M., Penna., Boston.
Moses, E. P. Chief Car Draughtsman, N. Y. C. & H. R.
Mullins, E. E., S. M. B. & C. Dept., Northern Ry. of Costa Rica, Pennhurst.
Mundorf, Samuel, Foreman Car Inspector, Penna. R. R., Silverdale.
Nation, J. D., T. Eng., Penna.
Norton, A. W., Draughtsman, B. & O., Arlington.
Parker, William V., Foreman Car Repair, W. J. & S.
Phelps, W. G., Asst. P. A., Pa. Lines, Traymore.
Pierson, E., Traveling Fireman, C. R. R. of N. J., Lyric.
Pratt, S. J., Gen'l Roundhouse For., D., L. & W., Lexington.
Press, W. J., Mech. Eng., N. T. R., Marlborough-Blenheim.
Rhodes, Robert S., Elec. Dept., N. Y. C., Runnymeade.
Robertson, E. J., Supt. Car Dept., Soo Line, Traymore.
Robertson, F. C. N., Pullman Co., Dennis.
Rogers, J. W., Elec. Supt., Penna.
Schaefer, F. H., Chief Clerk, L. S. & M. S. R. R., 109 S. New Jersey Ave.
Scatchard, H., General Storekeeper, N. & W. Ry. Co., St. Charles.
Schmidt, F. W., S. P., Strand.
Shelton, F. M., Supervisor, D., L. & W., Traymore.
Smith, J. J., Loco. Insp., B. & O.
Smith, R. J., District For. & Passenger Agt., Southern Pacific Company, 112 South Jackson Ave.
Spratt, Thomas, Asst. to Purchasing Agent, N. & O., Traymore.
Spreng, O. F., Leh. Val.
Stewart, V. R., Chief Draughtsman, N. Y. C. & H. R.
Resch, H. P., Offs. Passr. Train Master, Penna.
Trappe, W. C., Electrician, Penna.
Trievel, Geo. J., Foreman, Penna.
Walsh, C. E., Chief Clerk, Penna. Line, Traymore.
Weis, F. A., For. C. of N. J., Dunlop.
Weisbrod, R. R., Haddon Hall.
Wertz, Cyrus, For. Lt., Penna.
Whitsitt, W. B., Draughtsman, B. & O., Kenderton.
Williams, R. J., Supt. Shops, Big Four, Marlborough-Blenheim.
Wood, Horace, C. C. to P. A., Seaboard Air Lines, Shelburne.
Zerbee, S. J., Supervisor of Safety App., C. C. C. & St. L., Arlington.

NEW LINE FOR MANCHURIA.—Governor Chang-hsi-lan is said to have been authorized to build a light rail line for military use between Hsinmintun and Fakumen. Engineers have been sent out to start a survey of the proposed line.

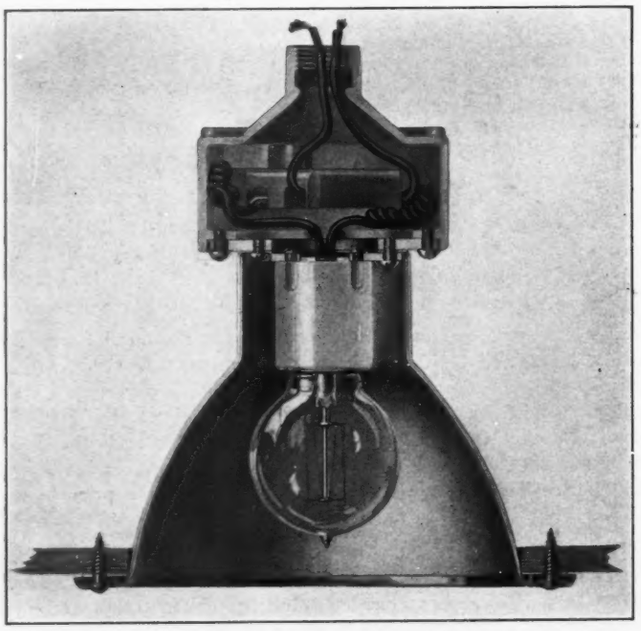
STRAITS SETTLEMENTS RAILWAYS.—Beginning on January 1, 1912, the railways of the Straits Settlements came under the management of the Federated Malay States Government. The terms called for a lease of 21 years at an annual rental of $95,200, subject to septennial revision. It is proposed to sell the railways to the Federated Malay States Government, and a joint committee has been considering the question of the price to be paid.

RAILWAY CONSTRUCTION IN KOREA.—Sixty-one miles of the railway to Cholwon, a station on the new line between Seoul and Gensan have been completed and opened to traffic. At the Gensan end of this line about 10 or 15 miles of road are now being operated, and vigorous work is being prosecuted on the intervening route. It is expected that through communication between Seoul and Gensan will be available for trains by November, 1913.

NORTHERN RAILWAY, SIAM.—The sum allotted for new construction on this railway during 1913 is more than twice as large as that for 1912. The explanation of this is that it has now been decided to push on with the construction of the line as far as Chiengmai, the chief town of Northern Siam. In previous reports it was stated that, owing to the difficult and less-paying nature of the country which the railway had then reached, it had been arranged for construction to be temporarily suspended when the line had advanced to a place called Dene Chai, about 139 miles southeast of Chiengmai. This was done in the interests of railway finance, in order to prevent any serious diminution in the dividend paid by the line; for a rapid and continuous extension through the less thickly populated parts of the country must, unless time is allowed to develop traffic, adversely affect the dividend-paying capacity of the whole railway. The necessary period for this purpose having now elapsed, it has been deemed opportune to continue the work of construction northwards: hence the increased allotment this year, which is made out of the unexpended balance of the last loan of $15,000,000 taken in January, 1907.

ELECTRIC LIGHTING FIXTURE FOR VESTIBULES.

Much of the expense involved in the inspection of electric light wiring on modern steel railway cars is unnecessary and is frequently the result of insufficient consideration of small details. With a steel ceiling it is often difficult to obtain access to electric wiring without involving the labor of removing the entire lighting fixture. This is particularly true as regards electric vestibule lighting fixtures and aside from the time and labor involved, the fixtures may be injured and the finish on the vestibule ceiling marred. The Safety Car Heating & Lighting Company, New York, has recently brought out an electric vestibule lighting fixture which has been designed particularly to give easy access to the electric wiring and also to provide for the most improved method of conduit construction. The illustration shows a section of this unit and it will be noted that a junction box is employed, having a terminal block for making connections to the circuit on which the fixture is located. When it is desired to inspect the wiring, the electric socket and flange are easily removed, giving free access to the terminal block connections without disturbing the balance of the fixture in any way. In this



Electric Fixture for Lighting Car Vestibules.

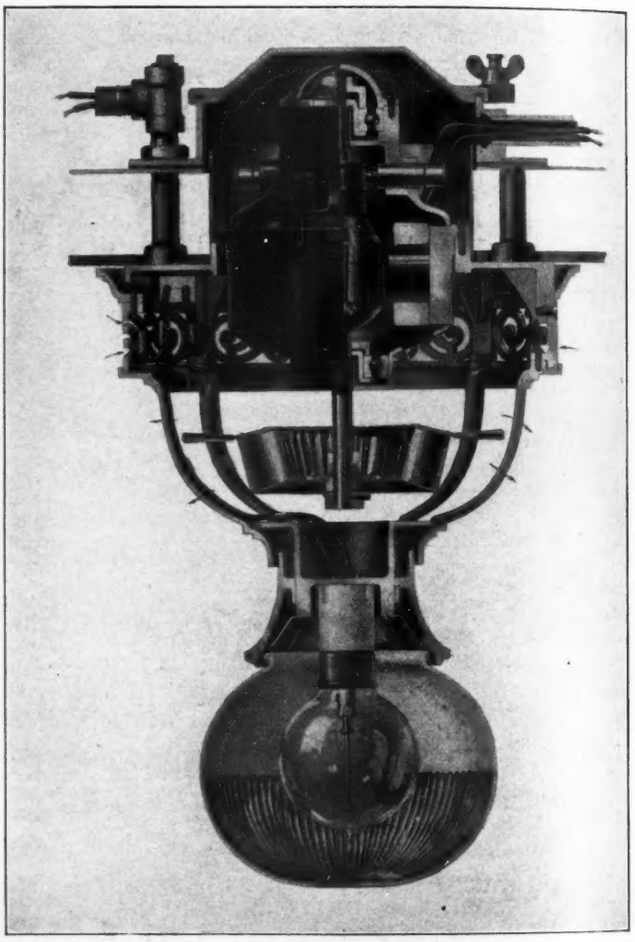
manner the fixture becomes actually a permanent part of the car, which is a very important consideration in steel car construction. The reflector, which also remains permanently in the car, is of white enamel and easily cleaned; it is securely fastened to the junction box at the top and to the ceiling of the vestibule at the bottom. A similar type of fixture employing the same method of wiring is made by this company for use as a pendant for saloons, dining car kitchens and other locations where glass reflectors are not required.

EFFICIFNT BROACHING MACHINE.—At the exhibit of Manning, Maxwell & Moore is shown a broaching machine made by J. N. Lapointe Company, New London, Conn. It is used for cutting internal gears; keyways, square or multiple spline holes for sliding gears as well as a considerable range of external work. It will cut keyways from the smallest to the largest size at the rate of 40 to 100 per hour. These can be either straight or tapered, or of the dove tail type. Internal gears up to 6 in. in diameter can be broached at the rate of 25 to 50 per hour.

COMBINED ELECTRIC FAN AND LIGHTING FIXTURE.

The use of fans for cooling and ventilating railway cars is a problem which has, up to the present, never been satisfactorily solved. The usual method employed is the installation of one or more bracket fans at each end of the car, which subject the passengers to drafts and do not produce effective ventilation, as the breeze is unequally distributed throughout the car. Large paddle fans are also used in many cases, particularly in dining cars, and while the results obtained with this type of fan are better than with the bracket fans, their appearance is unsightly and the mechanism requires considerable attention for its proper maintenance.

The Safety Car Heating & Lighting Company, New York, has developed a type of ceiling fan which may be used alone



Combined Electric Lighting Fixture and Fan.

or in combination with a lighting fixture as shown in the illustration.

The design of the fan portion of the fixture is the result of very careful study and experiments to control the direction of the air which is circulated. As the fan is located in the top portion of the fixture it is partially concealed by the ornamental work and does not detract from the appearance of the lighting fixture. The air is drawn in along the ceiling and thrown out at an angle of 45 deg., as shown by the arrows. The fan is driven by a ball bearing electric motor mounted in the ceiling in such a way as to be accessible from the roof and lubrication, renewal of brushes, etc., can be accomplished by opening the cover from the outside of the car.

COLD CUT-OFF SAW.

The Lea Equipment Company, Philadelphia, Pa., has made a number of improvements in its cold cut-off saws, which are embodied in the 1913 model. A large tank is provided in the frame to accommodate the lubricating compound and is so designed that none of the lubricant will find its way to the floor. The swing arm is equipped with a new style of wearing plate to facilitate the removal of the

Lea-Simplex Cold Cut-off Saw.

saw blades. The spiral gear drive which was a feature of former models has been replaced with a bevel gear drive and the drive shaft is also provided with an additional outboard bearing. The 1913 model is designed for either the use of standard blades or inserted tooth blades; the force pump is of a new pattern with a positive action, is driven from the feed box, and is so located as to prevent chips from getting into it. The control rod is provided with an additional

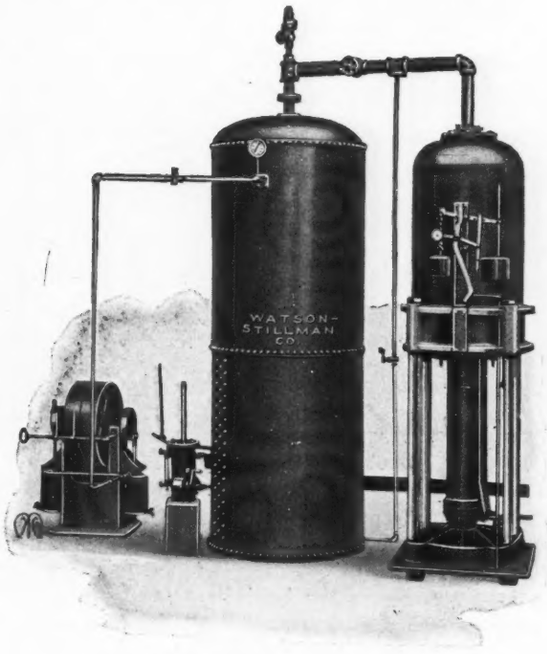
Lea-Simplex Saw Showing Motor Application.

steady bearing and the feed mechanism has automatic, as well as manual, control. The indicator dial formerly used has been replaced with an indicator rod which permits the operator to know at any time how much feed he is using. The yoke is of a heavier design than formerly and is provided with a large slot which permits movement of the screw in a direction parallel to the saw blade, thus providing a better adjustment of the blade to the stock. The V-blocks are now made in two parts and are separate from the table; they are intended for use in fastening either round, square or structural shape.

HYDRO-PNEUMATIC ACCUMULATOR.

With an increase in the number and size of tools operated by hydraulic pressure, the weighted type of accumulator used in connection with this service has grown to a very large and cumbersome size. The problem becomes especially complicated if it is necessary to locate the accumulator on the upper floors of a building.

An accumulator which is designed to contend with conditions that make the weighted type undesirable, is being exhibited by the Watson-Stillman Company, New York. This design has no heavy weights, and operates without shock; while occupying little space it is claimed it will do everything that a weighted accumulator will do. Furthermore, it provides two pressures. A low pressure is used for effecting that part of the stroke made against no resistance, which is a large percentage of the stroke of almost any hydraulic press tool. The high pressure is arranged to automatically come in action for effecting the final squeeze.



Hydro-Pneumatic Accumulator.

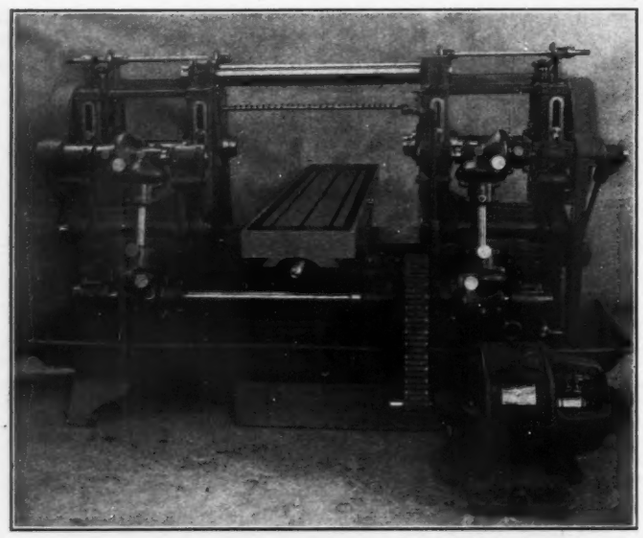
This combination of pressures is obtainable without complications in the operating valve or gear, and is entirely automatic in its action.

This type of accumulator is shown in the illustration. In the center is a large tank which is partially filled with water by means of a low pressure pump, the operation of which is controlled by a hydraulic governor which starts the pump and keeps it running until the water reaches a predetermined level, at which point it stops the pump, starting it again as soon as this level is lowered. Above the water is an air pressure of from 180 lbs. to 200 lbs., which is maintained by a special compressor forming part of the equipment. A low pressure feed main is run from the bottom of this tank and carried to the hydraulic tool. Alongside of this tank is the accumulator proper which has two cylinders, a large one at the top for pneumatic pressure and a small one at the bottom for hydraulic pressure. The areas of the pistons are made proportional to the pressures desired and available. There is a high pressure hydraulic pump connected with the

bottom of the accumulator, which is automatic in its action, and is controlled by a governor in the same manner as the low pressure pump. It is thus seen that both pumps are in operation only when a supply is required, and that there is no waste of power or efficiency since a high pressure is not used when a low pressure is sufficient. These accumulators are made in any size for pressures from 300 lbs. to 6000 lbs. per sq. in.

DOUBLE HEAD MILLING MACHINE.

A Lincoln type milling machine, manufactured by the Hendey Machine Company, Torrington, Conn., is shown in the exhibit of Manning, Maxwell & Moore. It is especially adapted to plain milling. As will be seen, the two heads are mounted on a long bed and there is an overhead arm connecting them and providing a rigid support above as well as below the spindles. The cutter spindles are driven through reduction gears from countershafts in hinged



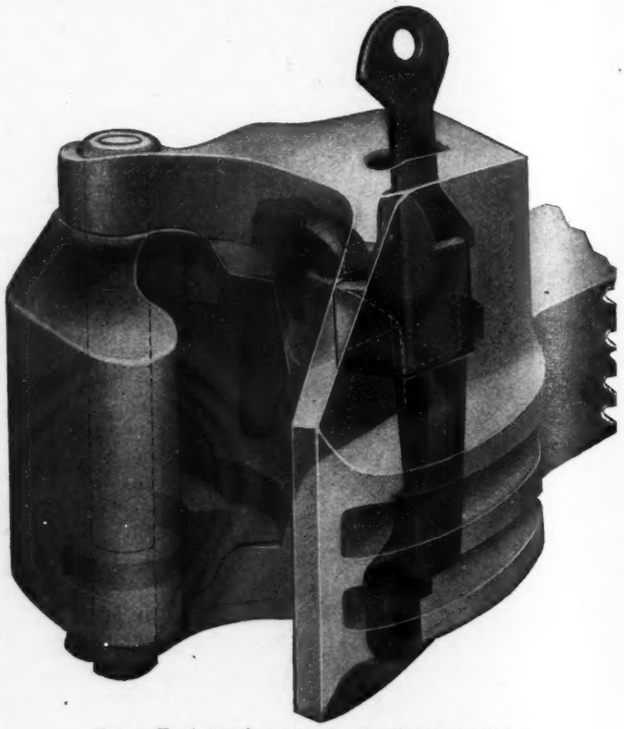
Double Head Milling Machine.

frames. The countershafts in turn are driven by bevel geared connections from a main shaft running along the back of the bed. This shaft is connected to the motor by a silent chain. One of the heads is arranged to slide along the bed. Provision is made for all desirable adjustments in each direction. The design is simple, compact and powerful.

PENN FREIGHT COUPLER.

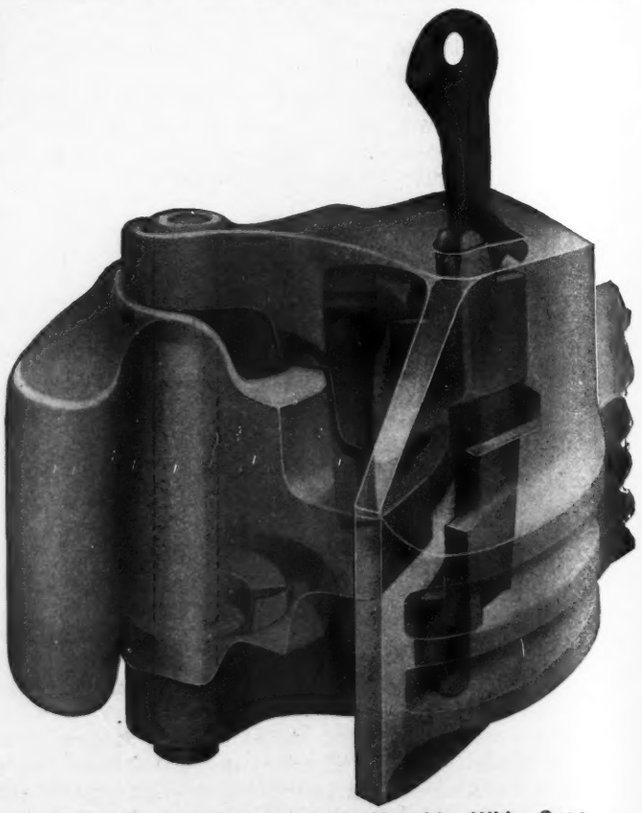
The McConway & Torley Company, Pittsburgh, Pa., is showing in its exhibit, spaces 501, 503 and 505, a new development of the Penn freight coupler, which has been redesigned to meet the present severe service conditions. The weight of the coupler has been increased over the average M. C. B. coupler from 30 to 40 per cent., depending on the size of the shank, the metal being carefully distributed to produce the best results. The coupler also embodies features of design, which not only contribute towards greater strength, but also tend to prolong the length of service and increase the efficiency in mechanical operation.

The knuckle is so designed that it has ribs engaging shoulders within the coupler head, which relieve the knuckle pin from draft strains, and when the coupler is under a pulling strain of 200,000 lbs. the knuckle pin can readily be removed. The vertical depth of the knuckle hub has been increased from 6 in. to 9 in. and the guard arm has been reinforced to correspond with the general dimensions. The knuckle-opener is of the bell crank type with direct mechanical action, and pushes the knuckle open to its fullest range of movement from either a fully closed or a partially open position; the lock adapted for



Penn Freight Coupler in Lock-set Position.

use with either an overhead or an underneath attachment of the uncoupling lever and has "lock-to-the-lock" and "lock-set



Penn Freight Coupler with Knuckle Wide Open.

features, while another important feature is the large bearing area between the contact surfaces of the locking block and the knuckle. One of the illustrations shows the head of the coupler

with the locking block raised to the "lock-set" position and the lock held in the uncoupled position by resting on a seat within the coupler head, from which it is dislodged by the closing movement of the knuckle in coupling. The second illustration shows the coupler with the locking block raised to its highest range of movement, bringing into operation the "knuckle-opener," which has pushed the knuckle completely open.

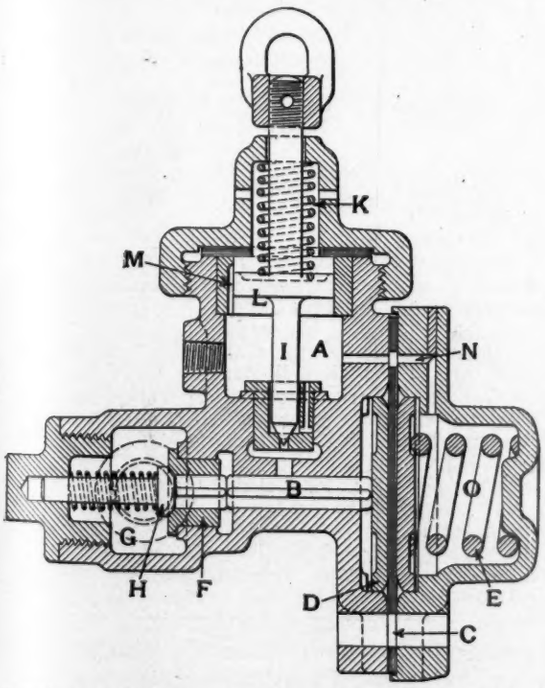
The coupler shown in the exhibit has a slight modification of the present M. C. B. lines. This company is also showing one of these couplers in connection with the exhibit of the M. C. B. Coupler Committee, and also another similar coupler with wide or open lines.

THE SAUVAGE AIR BRAKE SAFETY ATTACHMENTS.

John C. Knight, Inc., has an interesting exhibit of a number of safety devices for air brake work that have been designed by W. H. Sauvage. They do not in any way interfere with the regular operation of the air brake apparatus, nor do they require any changes in the methods of piping and attaching of that apparatus other than the mere connections involved in their application to the system.

They consist of a train line sustaining valve whose object is to automatically sustain the train line pressure at any point high or low at which it has been set, thus giving the engineer control of that pressure at all times ,independent of the position of the engineer's valve, preventing an unnaturally quick action of the triple valve, of an application of the brakes due to the leaking off of the train line pressure.

This may be supplemented by a discharge valve, which serves to accelerate the discharge of air from the train pipe



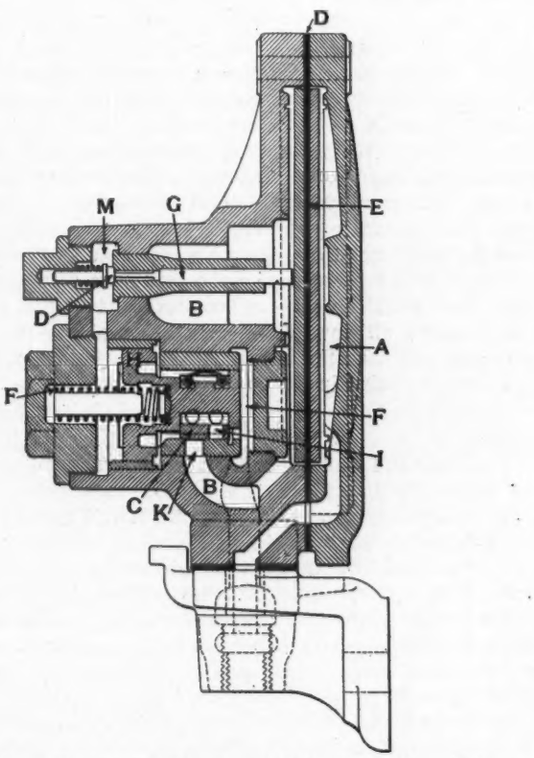
Sauvage Automatic Light and Load Brake Valve.

when the brakes are being applied on long trains only. It consists of a diaphragm to the top of which air from the equalizing reservoir is admitted while the connection to the train pipe comes in beneath. When the two pressures are the same the connection to the valve itself at the diaphragm makes a differential that holds this valve shut. But when the pressure in the equalizing reservoir drops below that of the train pipe, the latter pushes up the diaphragm and opens the valve that allows the air from the train pipe to escape to the atmosphere.

There is also a new form of retaining valve in which a spring is used to hold the valve to its seat instead of the usual weight. It is intended that this shall be attached, either to the triple valve or in the usual position. There is also a gage that is intended to be attached to the brake cylinder showing the pressure of air that exists in it. This is for the convenience of the inspectors and repair men to enable them to determine as to whether the brakes are acting properly or not.

In connection with the brake apparatus under the car there is also a brake cylinder accelerating and sustaining valve, the object of which is to hold a constant pressure in the brake cylinder and prevent leakage from lowering the braking power.

On the engine is an automatic warning and stop valve whose function is to blow a whistle in the cab when the



Sauvage Automatic Locomotive Train Line Sustaining Valve.

train line pressure falls below a predetermined amount which may be considered a danger point. The whistle continues to blow for a number of minutes and meanwhile it is gradually lowering the train line pressure and, unless the engineer takes measures to restore it and stop the whistle, it will continue to lower it to a point where the brakes will be applied and a stop will be necessitated.

One of the most interesting of the exhibits is a valve for varying the braking pressure according to the condition of the car as to whether it is loaded or empty.

There is also a signal valve by means of which the signal pipe is fed from the rear of the train instead of from the front so that when the engineer sees a pressure indicated in the signal pipe gage he knows that the pipes are open for the full length of the train.

Finally there is shown an ingenious angle cock by means of which no cock can be closed throughout the train without applying the brakes, except that on the last car. There are also a number of brake slack adjusters.

The automatic locomotive train line sustaining valve is shown in section in one of the drawings. There are three connections made to the piping of the air brake system. One to the main reservoir, a second to the equalizing reservoir and a third to the train line. The connection to the equal-

izing reservoir admits air to the right hand side of the diaphragm *D* to the space marked *A*. Air from the train line *B* and air from the main reservoir is admitted to the space marked *M* at the left and also to the backs of the two valves *C* and *D* and also surrounds the slide valve *C* and fills the space to the right of it marked *F*.

When a train line reduction is made and the pressures in the equalizing reservoir and train line have equalized the diaphragm *E* is balanced by the equal pressures on each side of it. If there is any leakage reducing the train line pressure, after that, the diaphragm moves to the left and, through the stem *G*, unseats the valve *D* permitting air to pass directly from the main reservoir to the space *B* thus raising the train line pressure. This holds so long as the valve *D* has a capacity sufficient to supply the leak when this is all that happens.

In the connection to the main reservoir from the space *F* the opening is large and free. From this space to the space *M* the air has to pass through the restricted area left by the clearance or play of the piston *H* in its cylinder. Hence when the draft by the train pipe is more than can leak through this restricted passage the pressure in *M* is lowered and the full main reservoir pressure in *F* moves the piston *H* to the left, carrying with it the slide valve *C*, causing the port *I* in the valve to open the passage *K* to *B*. Thus admitting air direct from the main reservoir to the train pipe. As soon as the pressures on the two sides of the diaphragm are again equalized, the latter moves back into its normal position and all flow of air from the main reservoir to the train pipe is cut off. In this manner a constant train pipe pressure is maintained.

LIGHT AND LOAD BRAKE.

The light and load brake is a simple arrangement by means of which the brake pressure on the wheels can be varied according to the total weight of the car. That is to say, for its light and loaded condition.

The principle of the operation is to use a brake cylinder much larger than would be suited for an empty car of the given weight if the full pressures that are ordinarily used in such a cylinder were employed. The auxilliary reservoir, however, is of the dimensions that would be used for a brake cylinder of the usual size. The result is that for the ordinary service reductions the pressure in the brake cylinder is much less than it would be with the full size reservoir, but the push on the brake road is about what is proper for the light weight of the car. Connected with the main auxilliary reservoir is another one which, by supplementing the first, is capable of raising the brake cylinder pressure up to the proper amount to secure full braking pressure on the loaded car. The method by which this second reservoir is thrown into action is controlled by the valve that is shown in the exhibit.

It is shown in section in one of the illustrations. In the charging of the regular reservoir, air is admitted through the triple valve in the usual manner and from this reservoir there is a connection leading to the point *B* of the light and load valve. Here it comes into contact with the left hand face of the diaphragm whose stiffening plate *D* is held against the seat to the left by the spring *E*. When in this position, it pushes the check valve *F* open and thus makes a free communication between the regular auxilliary and the supplementary reservoir which is connected to the chamber *G*. When the pressure in the reservoirs has reached 22 lbs. the air pressure against the left hand side of the diaphragm *C* presses it against its stop to the right, but the increasing air pressure at *B* still holds the check valve *H* open and the two reservoirs are charged together. As soon, however, as a train pipe reduction is made and air is drawn off from the reservoir to the brake cylinder, the pressure at *B* falls below that at *G* and the regular reservoir alone serves to charge the brake cylinder and the extra supply in the second reservoir is held back by the check valve *H*. This is the method of operation when the car is light.

When the brake is to be applied to a loaded car the stem *I* whose end is in the form of a valve is drawn back and with it the piston *L*. Until this is done the spring *K* holds the valve against its seat and any air pressure that may have leaked into the chamber *A* passes through the leakage groove *M* to the other side of the piston to the atmosphere. But when the piston is drawn back so as to cover the leakage groove, the full air pressure from the reservoir is admitted into the chamber *A* and this holds the piston *L* back against its seat. At the same time the air passes through the passage *N* to the chamber *O* and equalizes the air pressure on the two sides of the diaphragm. The spring *E* then presses the diaphragm to the left and holds the check valve *H* open. This puts the two reservoirs in communication with each other and they serve to increase the brake cylinder pressure accordingly. This continues as long as the piston *L* is held back against its seat. The pulling out of the stem is done by hand whenever it is desired to use the brake for a loaded car.

In order to prevent the application of the load brake to an empty car, the cutting out is made automatically. When the car has been set aside and the pressure in the system has fallen, the spring *K* forces the piston to the right again and by closing the needle valve automatically puts the brake back into the condition for use with the empty car.

SUPPLEMENTAL LIST OF EXHIBITORS.

Automatic Drill Chuck Company, New York, N. Y.—Automatic drill chuck. Represented by G. W. Emrick, Space 541.

Barcalo Manufacturing Company, Buffalo, N. Y.—Nonbinding pipe wrench. Represented by K. R. Shadek. Space 307.

Donath Valve Gear Company, Windsor, Mo.—Locomotive valve gear. Represented by Otto A. Donath and Holmes Hall. Space 381.

Grinden Art Metal Company, Brooklyn, N. Y.—Steel interior trim for steel passenger coaches. Space 300.

Kerr, Henry C., Roanoke, Va.—Model of car coupler. Represented by Henry C. Kerr. Space 194.

Remy Electric Company, Anderson, Ind.—American electric headlight—turbine generator and lamp. Represented by Joseph R. Arnold and Thos. B. Arnold. Space 631.

Siemund-Wenzel Electric Welding Company, New York, N. Y.—One 400 ampere welding machine in operation. Represented by G. S. Stuart, T. Rumney and W. D. Fowler. Space back of 188.

Stark & Company, Jas. P., Toledo, Ohio.—The Carpenter flush door. Represented by Jas. P. Stark and F. T. Carpenter. Space 13.

Wine Railway Appliance Company, Toledo, Ohio.—Locomotive and car specialties. Represented by C. J. Pilliod, Jr. Space 13.

KEY-CONNECTED CAST STEEL YOKES FOR NEW CARS.—During the past two years, a large number of cast steel drawbar yokes have been applied to new cars. These usually weigh from 155 to 195 pounds, depending on the type of drift gear used. With key-connected cast steel yokes it is possible to change the couplers without disturbing the draft gear or yoke, thus avoiding much of the handling in the shop and repair yards which is necessary with the old riveted type of yoke. The rivets which have for years been a source of heavy maintenance expense are entirely eliminated. As regards strength, yokes now manufactured are required to pull not less than 350,000 to 360,000 lbs. ultimate and have an elastic limit of 200,000 lbs. The Buckeye Steel Castings company, Columbus, Ohio, is exhibiting several types of these yokes.